

MOTOR AGE

Vol. XXXIV
No. 12

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Fifteen cents a copy
Three dollars a year

"The arrival of Maxwell Truck at Columbus Circle, New York City, after its record breaking run from San Francisco. The entire trip was completed without a single plug adjustment, replacement or attention of any kind, in fact the plugs were not removed from the motor from start to finish."

Ray McNamara,
Road Engineer.



Champion

Dependable Spark Plugs

Dependability Again Shown Over 31 Mountain Ranges



Champion Maxwell, $\frac{7}{8}$ -18
Price, \$1.00

THE irrefutable evidence of the dependability of Champion Spark Plugs continues to mount higher and higher. Concerning the remarkable cross-continent run of the Champion equipped Maxwell Truck (3,428.7 miles in 17 days, 8 hours and 20 minutes) Ray McNamara, Road Engineer, says:

"It was not necessary to remove a spark plug from the motor from start to finish, which performance is very phenomenal when the 31 mountain ranges that are crossed are taken into consideration; these ranges vary from two to twelve miles of steady climbing, and the same distance prevails going down on

the other side of the mountains, where it is necessary to use the motor to help hold back the load on the steep grades."

An overwhelming majority of all American motors are equipped with Champion Spark Plugs, because every test and experience demonstrates again and again their superior efficiency and durability.

Champion Spark Plug Company, Toledo, Ohio

Canadian Office: Champion Spark Plug Company of Canada, Limited, Windsor, Ontario

THIS 3 MINUTE PATCH CUTS TIRE COSTS

IF you'll carry a box of Johnson's Hastee Patch in your tool kit you can get away from the expense of a lot of spare tubes and casings which fast deteriorate during the hot motoring months. A box of Johnson's Hastee Patch in your car answers the same purpose as two or three extra tubes and casings. And there is a saving of 23c over garage vulcanizing on your smallest patch and much more on your large ones.

JOHNSON'S HASTEE PATCH

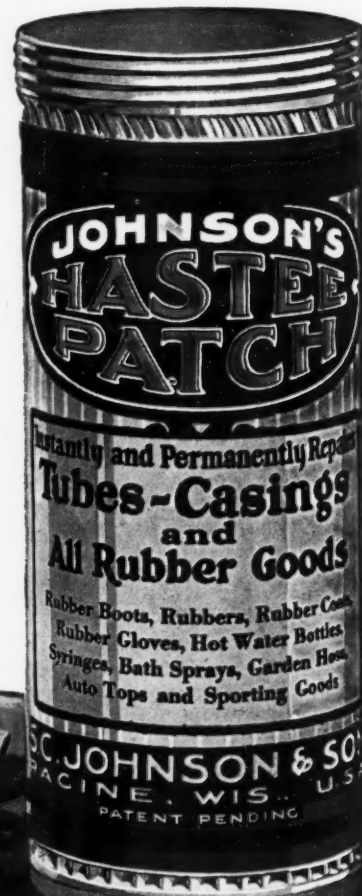
Johnson's Hastee Patch gives equally good results on a pin hole puncture or on a large blow out. It is conveniently put up in strips so the user can cut just the right size patch for each repair. With it the most inexperienced motorist can easily, satisfactorily and inexpensively patch his own tires. No time, labor or heat required. The patch can be applied in three minutes—at a cost of 2c and the tire is ready for instant use at any speed.

Johnson's Hastee Patch is not a make-shift—it permanently mends tubes and casings. It is much more satisfactory than vulcanizing because there is no danger of burning and spoiling the tube. The heat from the road does the vulcanizing.

If your dealer cannot supply you use attached coupon.

Fine for Patching

Garden Hose
Rubber Boots
Coats and Gloves
Rubbers
Auto Tops
Foot Balls
Hot Water Bottles
And All
Rubber Articles



AND IT'S ON TO STAY

J. C. JOHNSON & SON
I enclose 50c for which please send me by prepaid Parcel Post a 50c package of Johnson's Hastee Patch which I understand is sufficient for 25 average size patches. Satisfaction guaranteed or my money back. Also send me free your booklet on "Keeping Cars Young".

Name

Address

City & State

Dept. MA

RACINE, WIS.

Both Drivers Level When Plowing

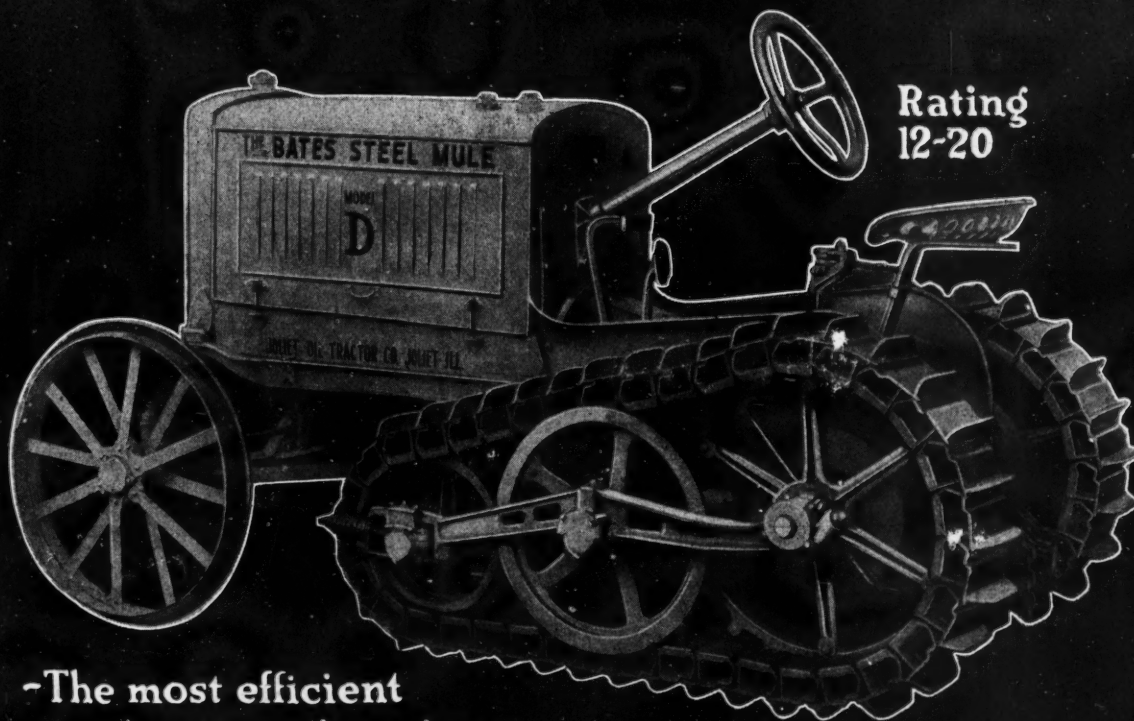
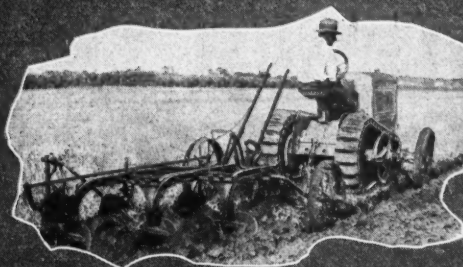
When plowing both drivers run level on the unplowed ground and one front wheel runs in the furrow for self steering.

This keeps the tractor standing straight, and eliminates any of the side thrust on bearings that is always present in tractors where they lean over because of a driver running in the furrow.

Perfect flexibility; unit construction of working parts; hardened cut steel transmission gears; Timken bearings; heavy duty valve-in-head kerosene motor and crawlers that endure the life of the tractor are some of the additional features of superiority.

If you are a progressive dealer, even in a territory that is already contracted for, it might be to your advantage to get in touch with us.

JOLIET OIL TRACTOR CO.
382 Jackson Street Joliet, Illinois



Rating
12-20

-The most efficient
tractor in America-

Garford
MOTOR
TRUCKS

Get this Business -Be a Garford Dealer

THOUSANDS can see this opportunity.

Many will *profit* by it. Will you?

—Then build for more permanent and profitable business.

—Be a Garford Dealer.

There is a Garford for every business need today!

The Garford Dealer is backed by a sound sales policy

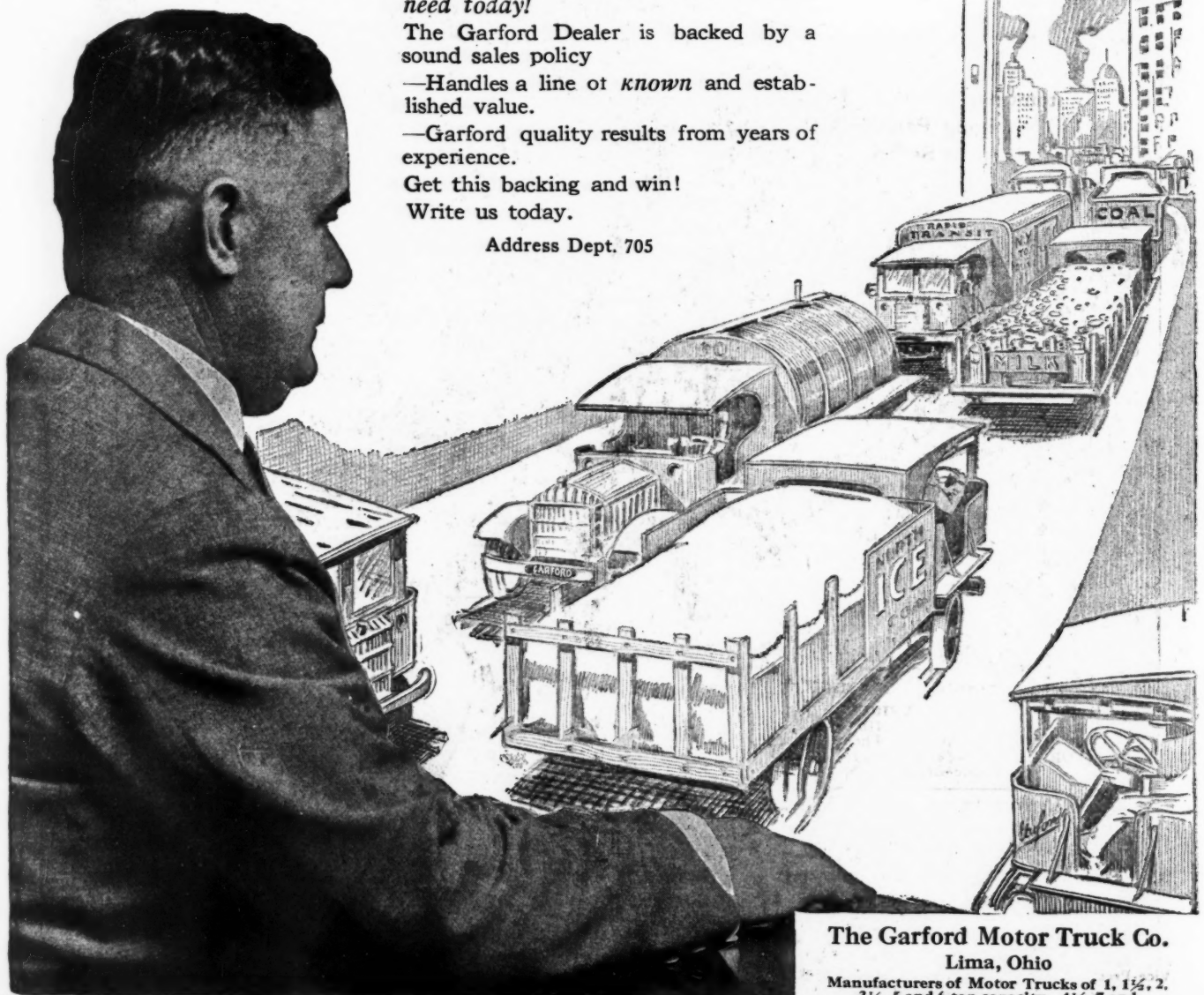
—Handles a line of *known* and established value.

—Garford quality results from years of experience.

Get this backing and win!

Write us today.

Address Dept. 705



The Garford Motor Truck Co.
Lima, Ohio

Manufacturers of Motor Trucks of 1, 1½, 2, 3½, 5 and 6 ton capacity. 4½, 7 and 10 ton Tractors.

When Writing to Advertisers, Please Mention Motor Age

MOTOR AGE

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E. E. HAIGHT, Manager

DAVID BEECROFT
Directing EditorDARWIN S. HATCH
Managing Editor

BRANCH OFFICES

DETROIT, 95 Fort St. W. CLEVELAND, 536-540 Guardian Bldg.
Phone Main 1351 Phone Main 1142
NEW YORK CITY, U. P. C. Bldg., 231-241 W. 39th St.
Phone Bryant 3760

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(PATENTED)



Estimate the serviceability of a machine by the staying power of its weakest part—that it is which sets the limit of service. Analyze it for the essentials. Follow the factors in serviceability through every detail, to the small parts which—while seemingly insignificant—yet determine the capacity of the machine as a whole for maintaining its performance.

The bearings of the electrical accessories of car, truck, tractor, power boat and airplane determine the service capacity of these machines. Which explains why "NORMA" Precision Bearings are the standard bearings in the ignition apparatus and lighting generators always preferred where maximum service is sought.

Be SURE. See that your
Electrical Accessories are
"NORMA" Equipped.



THE NORMA COMPANY OF AMERICA

1790 BROADWAY

NEW YORK

Ball, Roller, Thrust and Combination Bearings



Let Anchor Tops Pay Your Overhead

They Bring New Profits and They Sell On Sight

HAVE you carefully considered the tremendous possibilities for the sale of ANCHOR WINTER TOPS in your community? Hundreds of dealers have already ordered and received carloads of ANCHOR TOPS for distribution during the Fall and Winter months.

Many dealers who had despaired of making sufficient sales on other lines to cover their overhead for the Fall months, have solved the problem by ordering ANCHOR TOPS now when they can get them.

True, it takes some investment to store from one to five carloads of ANCHOR TOPS, but the turn-over is quickly made, as the bulk of the Winter Tops sales are made between now and January 1st.

Wise dealers know that there can be but few shipments of Winter Tops after November 15th, and that shipments after the first of November will necessarily be delayed.

The object of this advertisement is not to tell of the big advantage to the dealer in the transformation of open cars into Sedans or Coupes, because this is already a well known fact and the driving public is rapidly being educated to the use of Winter Tops. What we desire to impress upon the dealer at the present moment, is not only the necessity for

placing orders immediately for December, January and February requirements, but the value of this top as a means of taking care of overhead expense—or if you please, its value as a profit maker.

The Anchor Top is comfortable, beautiful and practicable. It fits the body irons of your car perfectly, so that there is no overhanging, no squeaking, no rattling. No expert is needed to install them. They are charming in outline, upholstered in whipcord, equipped with dome lights. They sell on sight.

Rush Your Order Now

Only those dealers and car owners who place their orders early are sure of being supplied.

Rush coupon to us for prices and photo prints. If you already are an Anchor dealer, send your orders to us as soon as possible, and thus be sure that you will be supplied with the ANCHOR TOP in due time for the Fall and Winter trade.

The Anchor Top & Body Co., 733-C South St., Cincinnati, Ohio

Fine Coach Builders for 30 Years

Dealer's
Confidential
Coupon

THE ANCHOR
TOP & BODY CO.
733-C South Street
Cincinnati, Ohio

Send photo designs, prices,
discounts and co-operative sales
offer on Anchor Tops.

Cars we handle.....

Dealer's Name.....

Address.....

When Writing to Advertisers, Please Mention Motor Age

Fathering the Motor Age Family

Did you ever have a family of 32,000 "grown-ups" with 32,000 birthdays coming every week?

If you haven't, then you don't know the privilege and responsibility of being circulation manager of Motor Age—because it is he who (with the help of our editors) actively fathers the Motor Age family of more than 32,000 members year in and year out, making it a more valuable, better pleased family every week.

What would you think, for instance, if you knew that every time a subscriber sends in his "sub," or renews an old one, or just moves to another address, it takes about two weeks of continuous progress to put the order through, route it for the post office, make a new plate for the addressing machine, etc.? Yet it does—and that is why our circulation manager always urges notice two weeks in advance of change of address, to avoid any interruption in the mailing of copies where you want to receive them—and when you need them most.

And would you believe, for example, that the circulation department has a "morgue" where subscriptions, remittances and orders from unknowns are held until they can be properly identified, because hundreds of prospective new members of the family forget to sign their name or give their address when they write to us? It would surprise you more than a little if you could see the number of letters, orders and cash remittances received by Motor Age during the year, without the name of the sender.

But the members of the Motor Age family are not the only ones who band together to keep the circulation manager out of mischief during the working day. After he sees to the mailing of his issues every week he is at the mercy of mails made slow by war, and deliveries that can't compare with the peace-time service of a few years ago. Every Thursday and Friday sees the issue mailed—so if it comes a day late, or two days, don't blame the circulation man. Don't blame anyone—it's no one's fault, except the Kaiser's, and his day is surely coming.

Wouldn't you like to see the wheels of Motor Age going around some day—serving the big family, of which you are one? Wouldn't you like to see how the circulation manager and his corps of assistants—21 floors up in the Mallers Bldg., Chicago—work for you from the day your subscription comes in until the last copy of Motor Age is delivered to you, and you are sending in your renewal for another good year?

If you would, come in and see us—ask for the circulation manager, and see for yourself what it means to be one of the proud parents of the family of Motor Age—32,000 of them—who must be pleased and served every week.



THE following list prices of Nash passenger cars and trucks are effective September 1, 1918:

| Model | Passenger Cars |
|----------------------|----------------|
| 681—5-Pass. Car | - - - - \$1490 |
| 682—7-Pass. Car | - - - - 1640 |
| 683—4-Pass. Roadster | - - - - 1490 |
| 684—6-Pass. Sedan | - - - - 2250 |
| 685—4-Pass. Coupe | - - - - 2250 |

| | Trucks |
|------------------------|--------------|
| 2017—One Ton Chassis | - - - \$1650 |
| 3017—Two Ton Chassis | - - - 2175 |
| 4017—Nash Quad Chassis | - - - 3250 |

Prices f. o. b. Kenosha

The Nash Motors Co., Kenosha, Wis.

*Manufacturers of Passenger Cars and Trucks
Including the Famous Nash Quad*

NASH MOTORS

VALUE CARS AT VOLUME PRICES

MOTOR AGE

This Tractor Needs a Home

*It Is Too Much to Expect a Machine Not to be
Harmed by Such Exposure*



This drawing is no pipe dream. It is from real life. Tractors are being left out in the rain without protection. They must have shelter. It is good business to take care of them

Wanted: A Tractor Home

Owner Should Furnish Shelter as Business Proposition

WANTED, a home. The care of a tractor means more than mechanical care. But the condition illustrated on the preceding page is all too common. The tractor on the farm needs a home and must have it if it is to give service all the time and at the right time.

Throughout the great agricultural regions it is very seldom that one can travel far and not see a tractor standing in the barnyard, in the field or by the road, uncovered and unprotected. Yet, as a tractor expert says elsewhere in this issue, the tractor must be under shelter.

Some of these farms in the agricultural regions of Kansas, Iowa and other states, have two- and three-car garages, yet leave their tractors out of doors over night and on rainy days. The scene on the preceding page is a reproduction of an actual field in Northern Wisconsin during a recent rainy period. Perhaps that farmer thought the rain would be over in a few hours; perhaps he thought he would be able to start plowing there again next day and the tractor would suffer no harm. But what if a rain kept up ten days or even three days, what kind of treatment would that be for the tractor? Not the right kind of treatment, to say the least. And yet the tractor owner who would do such a stunt probably would send 30 miles for someone to come and start his

tractor again if it stopped in the middle of the field of its own accord.

Such a tractor owner possibly will have to do that now. A tractor to a large extent is like a motor car. It is not like a steel portable engine or a steel separator. It is not the kind of machine the maker would recommend to be left out in the rain without any protection at all and guarantee its working not to be affected in the least. Rain may be a good thing for some machinery in that it washes the dirt off, but not for a machine such as the tractor is.

The tractor should be under shelter especially during rain. Water may ruin the carburetion, in the first place, or the ignition or some other vital part. Did you ever have a car go back on you after standing out in the rain? Didn't it fail to start? The same thing applies to the tractor. It may have to be dried out and perhaps be idle until an expert can locate the trouble. The tractor should have the same careful shelter that a motor car receives. It pays. The farmer cannot afford to be without the use of his tractor. It is a business proposition. He makes his money largely through it. It must be kept in constant working order. To do this not only must he be able to remedy any mechanical troubles himself or be within easy reach of someone who can, but he must give his tractor the benefit of a shelter. He must furnish his tractor with a home.

Status of Car Parts

N. A. A. J. Asks Members to Engage in War Work and File Statements

Result of Conference with War Board

CHICAGO, Sept. 14—Status of manufacturers of parts and accessories for motor cars, trucks and tractors has been to some extent clarified by the request of the National Association of Automobile Accessory Jobbers that members of that body engage in war work and eliminate non-essentials from their business and file a statement showing their consumption of steel, fuel and labor.

This came as a result of a conference with the War Industries Board at which representatives of the association were assured that if it can be placed on a strictly essential basis, the manufacturers will receive such proportion of steel and other metals as is their proportion of all the materials that can be diverted from the war program of the Government.

The N. A. A. J. represents 212 jobbing houses and 230 manufacturers of jobbers' wares and other products and asked a ruling "that will clearly define what in your judgment you may consider essential and non-essential lines of this industry."

Commissioner Webster of the N. A. A. J. in his request discloses a new angle of the materials situation. That is the pos-

sibility heretofore not generally taken seriously, that Government insistence on pledges and priorities which now applies to steel, rubber, coal and a few other materials may be extended to many other commodities. Webster states that heretofore the pledge required has generally referred to the matter of steel but that he was "fully impressed with the fact that it will cover and apply to other important commodities in the near future."

Members are asked to pledge not to use, or permit the use of, stocks in the possession or control of the signer, except:

"(1) For essential uses as that term may be defined from time to time by the Priorities Division of the War Industries Board, or

"(2) Under permits in writing signed by the Director of Steel Supply."

Signors also pledge to "Make no sale or delivery from such stocks to any customer or retailer before his filing with me a similar pledge in writing . . ."

A more definite statement as to the essential status of the industry may come from the next conference between the jobbers' association and the War Industries Board, for which the jobbers are now gathering data.

COOPER IS DISQUALIFIED

New York, Sept. 14—Earl Cooper, of Sacramento, Cal., also has been disqualified by the contest board of the A. A. A. because of his participation in several unsanctioned track races. He has been suspended temporarily pending further investigation.

Who Shall Dealer Be?

Farm Implement and Tractor Men Give Views on Merchandising

Old and New Now in the Agricultural Field

MILWAUKEE, Wis., Sept. 13—The farmer is sold on tractors far in advance of the dealer, according to F. W. Geddes, Wisconsin distributor for the Cleveland tractor, who spoke on merchandising tractors before the Wisconsin Power Farming Association here to-night.

The same subject was discussed by A. D. Paine, Oshkosh, Wis., distributor for the La Crosse tractor. Mr. Paine represents the old school of distributor which was trained in the implement business, and the contrast between what he had to say and what Mr. Geddes said measures all the difference between the new and the old in the tractor merchandising.

The objects and aims of the Wisconsin Power Farming Association also were presented by F. F. Hatcher, Milwaukee manager of the John Deere Plow Co. Mr. Hatcher said it was necessary first to get rid of the idea that the association has any selfish point of view for anyone. Upon the contrary, the purposes of the organization are to give impartial consideration to the problems which have come up in the merchandising of tractors to the end that the business may be conducted along right lines and

to the best advantage of everybody interested.

The prime essential in the tractor trade at this time is the establishment of confidential relations between the distributor, the dealer and the farmer. The association can and should be very instrumental in bringing this about.

Mr. Hatcher illustrated his meaning by calling attention to the evils which have resulted from the practice of over-selling tractors, that is, making representations regarding them which cannot be borne out in their subsequent performance. This merely is typical of many of the ills which may creep into the trade unless harmonious and cordial relations exist between all the men engaged in the trade upon whom responsibility rests and the purpose of the association is to foster such relations.

Mr. Geddes, in presenting the merchandising end of the tractor business, asserted that the great present problem in merchandising tractors is the dealer. Whom shall he be? What manner of man ought he to be? Shall he be the motor car dealer or the old time implement dealer? What equipment must he have? What degree and what kind of service must he render? What must he do in the way of maintaining a stock of repairs, etc.?

Problems of Distributer

These are the problems which confront the distributor who has the ambition worthy to represent his tractor and who desires to get his share in a satisfactory business. As matters now stand the dealer is not what he should be. The dealer, as a rule, is not sold. He realizes neither his opportunities nor his responsibilities. The old time implement dealer is bound by tradition, while the new motor car dealer is inexperienced.

The solution is education. This the tractor manufacturer and the distributor must undertake. Mr. Geddes stated emphatically that he found the motor car dealer as a rule better equipped for service than is the implement dealer, more aggressive and progressive and more amenable to instruction. For this reason he prefers him as an agent.

Mr. Geddes read from his 1919 sales contract a provision which makes it conditional upon the dealer to carry at all times an adequate stock of spares. Mr. Geddes also stated positively that the dealer must assume service obligations, since the distributor cannot do so, but that the dealer should be amply compensated if he did do so.

Mr. Paine, upon the other hand, represents the school which has been trained in the implement business and which regards the implement dealer as the logical and desirable tractor agent. Mr. Paine considers the burden of service to rest upon the shoulders of the tractor manufacturer and distributor. This is the old-time implement idea. He said that in disposing of over 100 tractors during the last year he had himself or through his organization sold over 90 per cent of them direct, the dealer merely acting as advance scout but getting the commission. The speaker did not defend this as right but he maintained it was a condition in the trade which the distributor must meet and allow for. He had tried the motor car dealer as an agent but had not been satisfied and believes that

Truck Control Changed

Purchase and Production Is Put Back in Quartermaster Department

Col. Fred Glover Placed in Old Position

WASHINGTON, Sept. 13—The purchase, production and procurement of Army motor vehicles have been taken from the duties of the recently created Motor Transport Corps and again placed in the Quartermaster Department with Col. Fred Glover in charge as before. Col. Edwin S. George, who also was transferred, is in charge of production.

Cols. C. B. Drake, James F. Furlow and C. Seamon remain in charge of the Motor Transport Corps, which now controls the engineering, operation and maintenance of Army motor vehicles.

Complete rearrangement of practically the entire Army plan of operation preceded these moves. At the direction of Gen.-Maj. George W. Goethals, who is also director of purchase, storage and traffic, orders were issued recently making him the direct chief of all purchases and ordering Gen. W. Wood, Quartermaster General, to report directly to General Goethals. Following this, additional orders were promulgated taking the control of purchase, production and procurement from the Motor Transport Corps and again placing it under Colonel Glover.

There has been considerable jockeying for control of Army truck activities. First there was the Motor Transport Section of the Quartermaster Department in charge of trucks under Brig. Gen. C. B. Baker, who favored the standardized trucks designed for the Army. Last spring, after continuous attacks upon these war trucks, the control of trucks was taken from General Baker. A Motor Transport Service was organized under Colonel Glover with the aid of General Goethals. Tests were held

he will do better by sticking to the old-line implement man regardless of the shortcomings the latter may manifest.

Mr. Paine admitted there was room for education in this direction and looked to the association to be a help.

The importance of selling the banker also was discussed. It was suggested that all traveling salesmen and blockmen be instructed to call upon the banker also in every town they visited. Mr. Geddes said he instructed his agents to get the local banker out to every demonstration.

Service and dealer discounts will be the subjects of discussion at the next meeting of the association.

The attendance at the meeting to-night was disappointing because of a misunderstanding upon the part of the hotel people, who turned away some fifteen men who came inquiring for the place of meeting. However, the meeting was profitable and it was indicative of the interest which will be taken in future meetings of the organization.

and some of the standardized war trucks were discarded in favor of standard makes of trucks. After about ten weeks of control and following Secretary Baker's return from Europe, the Motor Transport Service was abolished, Colonel Glover was transferred, and the Motor Transport Corps was created with the same men in charge who had been under General Baker. This was within the last thirty days. Now comes the new abrupt change, following Secretary Baker's return to Europe, with Colonel Glover again in charge.

The opinion was expressed in Washington that the creation of the Motor Transport Corps with the regime favoring standardized trucks in charge meant that the truck policy of the Army was settled permanently. Officials told of past lobbying and policies and claimed that the "election was over." Apparently they were incorrect. A recount, it seems, has been taken.

As a result of these many changes considerable delay and confusion exists. While the changes have been in progress Army truck plans have been neglected. In addition there is the confusion of the reorganization. Up to late last week the Motor Transport Corps had no knowledge of the new change and proceeded to build up an organization calling upon many important individuals who in turn proceeded to give up their present connections to come to Washington. Some of these men have arrived and they do not know now what positions they hold or what to expect.

STUDEBAKER STOPS MAKING CARS

South Bend, Ind., Sept. 17—Production of Studebaker passenger cars will stop as soon as the present stock of materials has been worked. This announcement was made to 150 Studebaker dealers who gathered here today to get an outline of the company's relations in regard to dealers. Jan. 1 is the date set for the termination of passenger car work, from which time on the concern will do 100 per cent war work. The company is erecting some 300 homes in this city for workers to be employed in the shell plant, which also will be in operation about the first of the year.

About 150 dealers were present at today's meeting. The continued rendering of Studebaker service was regarded as essential and the furnishing of parts and replacements will be carried on as heretofore through the customary channels. The company's intentions are to give Studebaker owners the best of service. Motor car production will cease until the present steel situation permits resumption of manufacture.

NO MORE PACKARD CARS

Detroit, Sept. 14—The entire resources of the Packard plant are to be devoted to war work from now on. Packard will deliver trucks to essential industries, but all other new products will be taken by the Government. Service will be maintained on the trucks and passenger cars now in use, and service stations and dealers will be supplied with essential parts.

In letters to its 110 dealers Packard points out that the accessory business can be developed and allied lines of business taken on where conditions warrant it.

to the shop foreman. No difficulty would be experienced in placing the orders in the proper cars, because each car on the shop floor bears its number and the repair order bears the same number. The original number, section 4 of form 5, is not removed from the car until the car is delivered to the customer.

The advantage of this lies in the fact that as soon as the job is finished the repair order immediately can be directed to the office and the customer's account figured up before his arrival, and at the same time, merely by referring to the customer's claim check or the copy of the repair order you easily can select the proper car from its number. With the old method the repair order either had to be left in the car until the customer called for his car, or if it was turned into the office the locating of the car was more or less a matter of guess work, because the car itself possessed no other record. Section 2 of form 5 is detached at the time of making the repair order. It serves as a check in this way: If that portion of form 5 still remains it is an indication that you have not made a repair order for that particular job. Of course, it is possible to forget detaching this section at the time of making the order, but a glance at your copies will re-

veal it and prevent duplicating the order.

Form 6 represents an individual mechanic's record for the day. As each repair order is turned into the office the bookkeeper refers to the workman's number, which in this instance is No. 5. It might be explained that at the beginning of each day a sheet, form 6, is commenced for each mechanic in the repairshop. In this event Mechanic Brown's sheet would be brought out and a record of job 1020 noted. On the back side of the repair order we find that Brown started work at 1:30 and finished at 4:20, which represents a total of 2 hr. 50 min. Instead of listing the time as 2 hr. and 50 min. it is listed 2.8 (two and eight-tenths) hr., which is more convenient to figure and does not figure up inaccurately at the end of the day. Brown's hourly wage is shown in the third column, which is fifty cents per hour. In the fourth column we have enumerated \$1.40, which is the actual cost of Brown's labor. The fifth column, while it must not be omitted at present, will be taken into consideration later. The sixth column shows the total cost of labor, which in this instance is \$1.40, because no commission is figured. Column 7 shows the amount charged or received from the customer, and the difference between the cost and the amount re-

ceived is placed in column 8, showing that \$2.60 profit was made on labor alone from job 1020.

Each job completed by the different workmen is treated in the same way, and at the end of the day the several workmen's records are totaled, as shown in the illustration. Upon the completion of every job you know exactly what amount of profit was made, and at the end of each day you know exactly how much profit you have made on each and all of the mechanics in your employ. This little record shows up the efficiency of your mechanics more than any other record which possibly could be installed, and the effect which it bears upon the individual mechanic, knowing that he is being checked so closely, is amazing. I know of one institution which installed this method, and soon afterward a rivalry was set up among the mechanics in the way of one trying to accomplish more than the other. This can be encouraged by making it a point to show your appreciation of their efforts.

In the installment of last week the captions for Figs. 2 and 4 were transposed. Fig. 4, or form 4, is that on which the workman lists needed parts and is at the left, while Fig. 2 is the back side of the original and the duplicate and is above.

Trucks for Essential Civilian Uses

Priority Industry Certificates for Manufacturers

WASHINGTON, Sept. 14—Priority certificates for the manufacture of motor trucks, insuring delivery of materials and parts, are being certified by the War Industries Board, through the Automotive Products Section, to the Priorities Division, following the decision to give trucks a priority rating of class B4. The certificates relate only to production of trucks for essential civilian uses, as distinguished from trucks built in war orders, which may take a higher rating.

The certificates authorize the manufacturer to purchase materials for the completion of a specified number of trucks from July 1 to Dec. 31, 1918, for "essential civilian use."

Basis of Production

The basis on which the maximum number of trucks a maker may produce is a third of the total number produced for civilian use during all 1917 and the first half of 1918. In view of the steel situation the board expects that the effect of the pledges of co-operation signed by the manufacturers, which was published in an earlier issue of *MOTOR AGE*, will be to curtail sales of motor trucks. It is felt that the board will not look with favor on any increased production beyond the average of the last eighteen months. The opinion is that the number a maker may be permitted to make by the terms of the certificate does not justify it in making such a number unless they are necessary to supply the demand from essential industries.

In a few cases where the production during the first half of this year shows a reduction from last year, due to heavy production of war trucks, the allotment has

been reduced to a basis of the production for the first six months of 1918, with the exception that continuing or expected additional war orders will counterbalance the reduction.

Where a company was not in real production during all of 1917 the allotment has been based on the average of the period during which it was in production.

After the industry priorities certificate has been approved by the priorities division it will be delivered to the manufacturer and will authorize him to purchase the materials necessary to complete the specified number of trucks and will contain a form of affidavit which he will attach to each order for material from the supplier. This affidavit is the only release needed by the supplier to fill the order. This arrangement has superseded the former requirement for individual priority certificates for each order. Priority certificates that have been filed with the board already will not be acted on for this reason. In most cases the manufacturer will have to revise his orders to conform with the number of trucks he is authorized to complete by Dec. 31.

Manufacturers of road tractors, trailer, truck attachments and body makers who build for the trade and do not dispose of their entire product direct to the truck manufacturers probably will be considered as coming within the same classification as truck manufacturers to be taken care of under the same arrangement. If they have not already done so they will be required to furnish to the Automotive Products Section a sworn statement of their production during 1916, 1917 and the first half of 1918, including any war orders

separately, and a statement of the nature of their business. The industry priorities certificates, if issued to them, will authorize them to obtain the required quantities of steel or parts involving the use of steel from their material suppliers.

Any doubt as to where a particular business comes under the foregoing should be clarified by inquiry of the Automotive Products Section of the War Industries Board.

TO LIST ESSENTIAL TRUCK BUYERS

Washington, Sept. 13—A list of industries is being prepared by the motor truck committee of the National Automobile Chamber of Commerce which will comprise those industries of the nation important enough, or in other words essential, to be considered legitimate motor truck purchasers. This list of industries will guide motor truck manufacturers and distributors in their sales of trucks to the consumers. The War Industries Board, following its approval of the general motor truck industry as an essential one, requested that trucks be sold only to essential consumers. The original plan was to make up such a list and to include it with the Governmental rulings regarding the truck industries. This plan was abandoned and truck manufacturers were placed upon their honor.

Many questions have arisen, however, as to just what constitutes an essential concern, and numerous distributors have been in doubt regarding sales, and in consequence the list of essential consumers is being prepared by the truck committee, of which George Graham is chairman.

Gasless Sundays to be Continued

Fuel Administration Replies to Senate—Figures Indicate a Probable Deficit of 1,000,000 Bbls.

WASHINGTON, Sept. 14—Gasless Sundays will continue for some time, the Fuel Administration says. Doctor Garfield states in reply to the request of the Senate for information on the situation that unless conservation steps are taken immediately there will be a deficit of 1,000,000 bbl. of gasoline by the end of the year. Aug. 24 there were 645,000 bbl. of gasoline at Atlantic coast storage points, and the demand for available tankers was 616,000 bbl. This caused the gasolineless Sunday order, says Doctor Garfield. Seaboard domestic use was to be supplied from the 645,000 bbl. in addition to exports.

In the figures submitted to the Senate by the Fuel Administration the daily domestic consumption in this country was given as 160,000 bbl. with exports of 34,000 bbl. daily, making a total consumption of 194,000 bbl., as comparable to 191,000 bbl. produced daily, leaving an average daily deficit of 3000 bbl.

Gasoline and naphtha stocks Jan. 1, 1918, totaled 8,400,000 bbl., were increased to 11,000,000 bbl. April 1 and fell to 7,800,000 bbl. by Aug. 1.

A Seasonal Product

These figures should be read with the understanding that gasoline is a seasonal product, with the maximum consumption in the period April to September, inclusive, and with the peak load coming in June, July and August. Records for April, May and June combined—July and August are not complete—show an approximate daily average consumption of, domestic, 199,000 bbl. and, export, 37,000, or a total of 236,000 bbl., as compared with 216,000 bbl. for the approximate daily average production during that time—a daily deficit of 20,000 bbl. for the three months.

Total reduction of gasoline and naphtha stocks during July was approximately 1,367,000 bbl., or 44,000 bbl. daily. Recently 250 cars of gasoline were purchased in California and are moving eastward with the expectation that more will be purchased soon, but stocks of crude are declining and kerosene and fuel oil supplies are unsatisfactory, the report says, all of which bears an intimate relation to the gasoline problem.

It is estimated by the fuel administrator that reports for August from territory east of the California fields would show a reduction of 2,000,000 bbl., or 65,000 daily, and with the August reduction in stocks materializing the reserve supply would be reduced to not more than thirty days' supply.

A shortage of gasoline in California also is shown in the report, which states that the stocks on hand there Jan. 1 were 1,502,000 bbl. and that on Aug. 1 the supply dropped to 848,000 bbl. The California daily consumption for the first half of this year was about 31,000 bbl., 2000 bbl. of which were exported, while the approximate daily

production for the same period was 28,000 bbl., leaving a daily deficit of 3000 bbl.

There is a possibility that the gasolineless Sunday request may be extended to cover the entire country, the Fuel Administration states. This will depend on the ability of the mid-continent refiners to supply the territory west of the Mississippi and at the same time furnish the gasoline they have agreed to deliver at the Atlantic seaboard.

The Bureau of Mines also has been requested by the Senate to give it all the information possible in regard to production and consumption of crude petroleum and other oils in this country, the amount required for export and the estimated stocks on hand at present. The resolution is similar to that requesting the same information from the Fuel Administration.

A count of the gasoline saved by the oil industry shows that the reduction in every state east of the Mississippi exceeded 75 per cent, and in each case the second Sunday showed larger decreases than the first. The amount saved has added materially to the reserves available for overseas shipment, according to a statement by the Fuel Administration.

The Fuel Administration states that figures compiled by the oil industry show 413,000 bbl. of gasoline were saved by the first two gasolineless Sundays. Illinois leads with a count of 20,000 Aug. 31 and 108 on Sept. 8, a reduction of 99 per cent.

In regard to the report that the Fuel Administration contemplates fixing the prices of gasoline throughout the country, as given in MOTOR AGE of last week, the Fuel Administrator states that a study is being made of costs and prices and on the basis of this investigation it is expected soon to effect any readjustment of prices that may be found reasonable and necessary.

U. S. Effect on Canada

Industry Looks to This Country for Parts to Assemble Cars

MONTREAL, Canada, Sept. 14—Some might imagine the Canadian end of the industry is not much affected by the decision of the United States War Industries Board, but a little thought will show the fallacy of this. Canada does not possess to-day a passenger car manufacturing plant that is complete in itself. Most of the parts of the cars that are "Made in Canada" are manufactured in the United States and are assembled in Canada, only a small proportion of the actual production being done in this country. Consequently any restrictions that are put upon the manufacture of parts in the United States

affects the supply to Canada, and it is sure that the industry in the United States is not going to supply Canada when it cannot supply its own needs. This particularly applies to the steel parts used in car construction, while apart from this the Canadian government regulates every pound of steel that comes into the country and it is so much needed for munitions work that there is not even any available for the manufacture of rails for the tramways systems.

Motorists will have to use discretion in utilizing their cars, for they will probably have to use them much longer than they would be required to do in normal times, and repairs will be harder and more expensive to obtain. There will be practically no new models for 1919, for not only are the designers engaged in more important work just now, but with the increased restrictions on manufacture there is no object in making expensive experiments now to secure an improvement which with the rapid strides that engineering science is making under the stress of war, may have to be discarded for something better when the war is won.

Canada Controls Its Steel

The Canadian government, through the War Trade Board, has taken over the control of steel production in Canada. The board is vested with full authority to give directions to the different companies as to the extent and character of their production. The reason is stated to be owing to the shortage of steel in the United States due to the great and constantly increasing demand for war purposes which makes it imperative that the greatest possible economy should be used. So the matter is now brought closer home than it was, when the United States War Industries Board acted, and it is safe to assume that very little Canadian steel will be available for passenger car production.

Some agencies in Montreal have already been notified that the passenger car portion of their firms has been suspended entirely and that the trucks are all that will be turned out in limited quantities for the general market. The agents presumably will turn their attention to the development of the truck industry and in this way the restrictions that are being placed on the whole industry will be somewhat of a blessing in disguise.

CANADA FOLLOWS SUIT

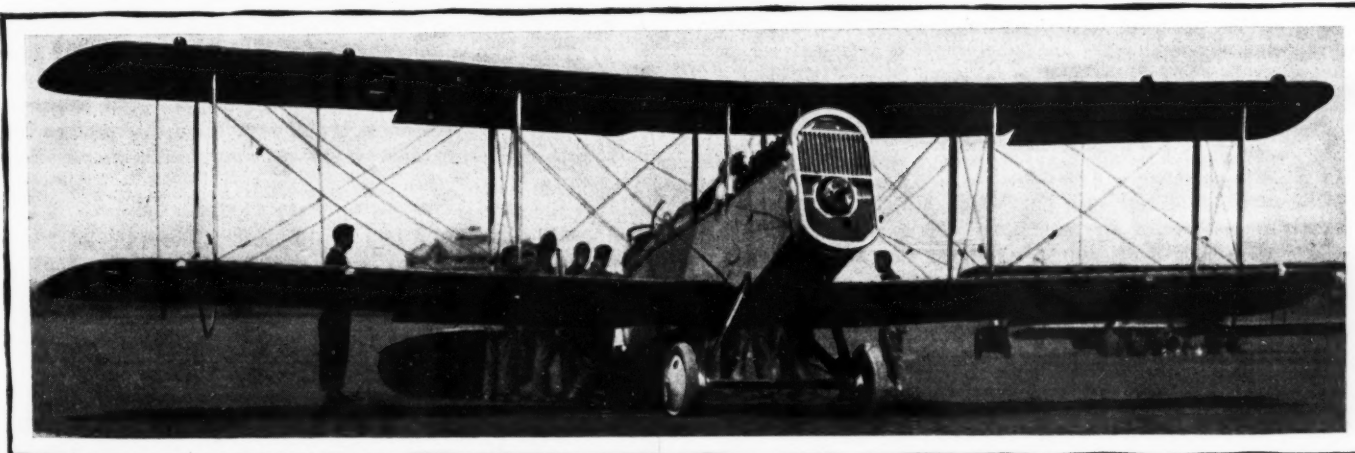
Montreal, Quebec, Sept. 13—Following the request in the United States that motor car users east of the Mississippi should forego Sunday use of their cars with a view to conserving gasoline, the Automobile Club of Canada is appealing to motorists to co-operate to this end for the coming four Sundays and is also asking all garages, service stations, etc., to close on those days.

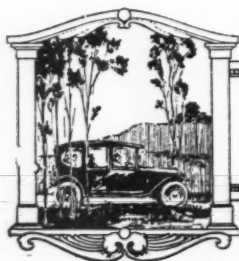
America's Latest Eagle

On these pages are shown the latest type of the De Haviland 4, which will be manufactured in this country and fitted with Liberty engines. In the top-most photograph, guarded by an armed guard, one of the new Liberty engines is shown in part. This is the twelve-cylinder, which is capable of developing 450 hp. at 825 lb. It is considered 50 per cent more powerful and 25 per cent lighter than the average airplane engine in service to-day. The cylinders have a bore and stroke of 5 by 7 in., and Liberty fuel consumption is approximately .46 lb. per horsepower per hour. More than 4,000 have been delivered, and it is approved by our allies, who are anxious to obtain more of them than we can supply.

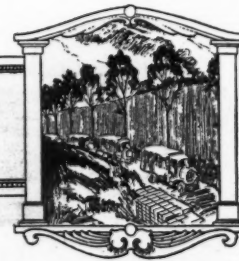


The wings are for another made-in-America De Haviland 4, a complete view of which is given at the bottom of the page. Already a group of these planes has been shipped to Europe, and last month they flew over the German lines on a tour of observation. Aug. 7 a squadron of eighteen De Haviland 4's flew over the German lines. Six hundred and one had been embarked for France Aug. 1. This country is equipping these planes for reconnaissance, photographic, bombing and fighting purposes. Outstanding contracts call for 8,500 of them. They are being manufactured by the Dayton-Wright and the Fisher Body companies, with smaller contracts to the Standard and one or two others.





EDITORIAL



Filling the Gasoline Tank

THE mere truth that the reduction in motoring was greater the second Sunday than the first is fully indicative of the quick response the industry and all concerned with it are making to every appeal from the Government. Called on to do without their cars the one day in the week, the car owners throughout the affected territory, east of the Mississippi, have put up their cars and either stayed at home or used some other, unaffected means of locomotion to reach their objective points. The first Sunday the reduction in motoring exceeded 75 per cent. This was counting those cars whose use is deemed obligatory unanimously—such as physicians' cars, public utility cars, trucks, etc.

THE need of the gasless Sunday has been questioned, by the Senate among others. But in view of the figures submitted by the Fuel Administration in reply to the Senate's inquiry the gasless Sunday has been requested sincerely. Even though some may question the figures compiled in view of the many denials

of shortage heretofore, there still remains the fact that, given the mere possibility of their being correct, the motoring public and the industry at large is perfectly willing to forego a Sunday of motoring to help bolster these figures up.

AUG. 24 there were at Atlantic coast storage points just 29,000 more barrels of gasoline than were required for available tankers. In addition seaboard domestic consumption was to be supplied. Impossible with a balance of only 29,000 barrels. The rest of the figures submitted by the Fuel Administration in reply to the Senate are given on other pages, and they are well worth study. No motorist can afford to pass them by without heeding them. Nor will he. He will just prepare his plans for the coming Sundays so that he can do without his car with less inconvenience and await the word from Washington that the gasless Sundays have served their purpose. And he will also root for more speed in the production so that we can keep on winning the war and using our cars for transportation also.

For a Modern Waterloo

IN the course of the War Department's statements to the public there appears the rather casual item that to each American army in the field will be allotted 154,747 officers and men for motor transport work. As it happens this is nearly as many officers and men as engaged on both sides in the memorable battle of Waterloo in which the world-rule dreams of the mighty Napoleon were shattered.

IN addition to the 154,747 officers and men, each American army will have 40,803 motor trucks, 24,250 motoreycles, 7,905 passenger cars and 6,593 ambulances in motor transport work. Witness the utility of the motor truck. Witness the utility of the

sometimes-called "pleasure car." Not to mention the other motor vehicles. History will go down on record with the credit for the saving of Verdun—and Paris—allotted to the motor truck. History also will mention the dispatch bearers and staff drivers who hurried through showers of shells and bullets by motor.

TIMES have changed since that first Waterloo. But there is another Waterloo coming. And the motor vehicle and the men who attend and drive it are going to be mighty powerful factors in deciding whose Waterloo it shall be. All power to our own country and its allies for their motor transport corps!

Ideals in Tractor Service

"WE try to reach all our service calls within one hour from the time we receive them."

THIS is not only the ideal but service that actually is given by a tractor dealer in the central part of Illinois. This dealer, handling motor cars and tractors, is a firm believer in rational service; in fact, he goes so far as to declare the success of the dealer handling tractors lies in service he gives and that his failure will be certain if he overlooks this service aspect of the business.

HIS conception of service is that which keeps the customer's tractor in continual service without delays and incidentally makes friends and boosters for the firm that delivers such service.

SUCH service is charged for at a rational rate and expert help is furnished. Where a farmer wishes expert assistance it is given on a charge basis of \$5 per day, plus expenses. Experience shows that the farmer after using his tractor for thirty days does not consider that he is entitled to free service except

where parts or workmanship are shown to be defective and the cost properly falls on the manufacturer.

THAT the rational farmer is coming to this conclusion is shown by the fact that there is little difficulty in collecting service charges from him, provided the work is done quickly and correctly so that he is enabled to keep his tractor in continual operation. Where the ideal of giving service within an hour is carried out in practice there is no question but that practically all farmers will be willing to pay rational service charges for such service.

ONE of the greatest errors that the dealer can make in treating with a farmer on tractor service is that of developing the fact that the farmer is entitled to free service. Where this is done the dealer literally becomes a slave to the farmer. Instead of the farmer developing his ingenuity and becoming more acquainted with the tractor so that he can make repairs himself, he sits back and lets the dealer carry the entire load. There are cases on record where a dealer has sent his service wagon thirty miles to discover that the trouble was a disconnected wire in

the ignition system. The farmer had made no effort to analyze the trouble intelligently and diagnose it. He knew that the dealer was at his beck and call. He knew the dealer would come to his farm and correct the job for nothing.

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THE farmer must be educated in taking care of his own tractor. He must be given to understand that he cannot operate a tractor and get any value out of it unless he is going to prepare himself for taking care of it. He must prepare himself to detect simple troubles in the ignition system. He must study the lubricating system. He must understand carbureter adjustment.

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HE cannot learn all of these at one time, but, nevertheless, he must start, and it is only in proportion as the dealer looks upon it as a part of his tractor sales and service to get the farmer thinking along these channels that his success in service will come. The farmer must not be a passive party in the service program. He must be an active member in the work. He must know how to detect loose terminals in the ignition system. He must know how to adjust the carbureter. He must understand engine lubrication. He must know how to grind valves, remove carbon and shims from a connecting rod bearing.

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THE tractor dealer who aims to build up his tractor business on free service is treading on dangerous ground. He is sowing the seeds of free service which are certain to bear fruit later on. Once he educates the farmers to free service he will find it very difficult to break away from it, and he will find some of these farmers leaving him and purchasing other machines when he begins to charge for service. There is no legitimate reason for free service unless the tractor is so poor that it should

never have been placed on the market. In such a case the dealer will be aware of this, and he had better discontinue the agency and lose what money he has invested than attempt to sell a lot of these hopelessly poor machines in his territory and then have to carry the burden of keeping them in operation, which, in some cases, according to reports, has been well-nigh impossible.

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THE farmer must have his tractor started off properly by an expert. It will be necessary for this expert to spend two or three days with the farmer, not operating the tractor for him but going around with the farmer, all the time watching him operate it and teaching him the nice points of the operation. After the farmer has been given schooling of this nature he should be able to run the machine for three or four days, at which time it would be a good investment for the dealer to have his expert drop in and see if the tractor is being abused in any way and again watch the farmer operate it to ascertain what uses are being indulged in. After one or two of such visits the farmer should be given to understand that the machine is his and his deeds are on his own head. If he abuses it by improper oiling, he must pay the cost. If he breaks parts due to his carelessness or accidents, he must understand that he has to pay the bill.

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IT is immeasurably better to start off this way than to travel on the road of free service for a year or so until you imagine you will have your business built up and then endeavor to rearrange your entire plans and start charging for service.

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SET up your ideal as to what service really is, efficient workmanship quickly given and a reasonable charge for same together with a complete stock of repairs which are sold at a rational figure.

Tire Filler Manufacturers Meet in Conference

Would Standardize Their Industry for Protection

CHICAGO, Sept. 16—That more than half a billion dollars would be saved annually in cost to the nation of pneumatic tires, inner tubes, etc., by universal adoption of filled tires is the contention of advocates of tire fillers, who are meeting at the Automobile Tire Economy Conference here this week.

With the object of "standardizing the filled tire industry and to protect it against irresponsible factors and non-dependable products, and to form a national association which shall have for its principal object the presentation to the government of a comprehensive plan for tire conservation," the conference was called, with Franc D. Mayer, of the Essenkay Products Co., acting as temporary secretary.

Concerns Represented

Representatives of the following concerns are in attendance:

Essenkay Products Co., Chicago; Peerless Tire Filler Co., Chicago; Dahl Punctureless Tire Co., Minneapolis, Minn.; Pan-American Rubber Co., Milwaukee, Wis.; National Rubber Filler Co., Midlothian, Tex.; Panama Rubber & Equipment Co., St. Louis, Mo.; Wolverine Tire Cushion & Accessory Co., Detroit; Rubberair, Inc., New York City; Better-Air Co., Philadelphia, Pa.; National Synthetic Tire & Rubber Co., New York City; Universal Tire Filler Co., Portland, Ore.; National Tire Cushion Co., Kansas City, Mo.

Yesterday the representatives present got together and formed a national association which will be known as the American Tire Filler Industry, Inc. The following officers were elected:

President, Franc D. Mayer, The Essenkay Co., Chicago; first vice-president, Frank Hager, Universal Tire Filler Co., Portland, Ore.; second vice-president, Lee Lockwood, Dahl Punctureless Tire Co., Minneapolis, Minn.; third vice-president, W. W. Major, National Tire Cushion Co., Kansas City, Mo.; secretary, C. P. Umstat, Peerless Tire Filler Co., Chicago.

The association will be incorporated, without profit, and its objects will be twofold: First, to standardize the industry, as previously stated, and second, to present to the Government a plan whereby there shall be, through the utilization of filled tires, not alone a patriotic conservation of rubber tires, but a saving of life and time by the use of filled tires in ambulance and transport service behind the fighting lines abroad.

In opening the conference to-day, Mr. Mayer presented some interesting figures relative to the total annual cost of pneumatic tires, inner tubes, etc., for the country at large. Assuming that the life of tires would be prolonged as the advocates of filled tires claim, and by adding the saving by the elimination of inner tubes and accessories, Mr. Mayer figured out an annual saving to the country of more than \$500,000,000, to say nothing of the conservation in rubber products. This was the economic point of view and justified the effort to secure conservation.

Humanitarian reasons justified the substitution of filled tires for pneumatics, in the ambulance service with the army, according to the statements of Mr. Mayer,

because of the increased mortality occasioned by moving wounded men in ambulances with punctured and deflated tires, or who lost their lives during the delay necessitated to change tires or to repair punctures behind the lines. It was stated that if punctures and blow-outs could be eliminated in ambulance service there would be a reduction of mortality in moving wounded men back to hospital stations of at least 5 per cent.

Mr. Mayer pointed out that Government officials already are interested in making such a substitution and that through the efforts of a national association it would be possible to induce the Government to take early action. He emphasized this end as one of the principal aims of the newly formed association.

Stretcher Bearer Speaks

Pipe-Major Colville, one of the original Princess Pats, spoke entertainingly of the experiences of his regiment in the trenches abroad and drew upon his own experience as a stretcher bearer to illustrate the difficulties experienced in evacuating wounded men. He explained also the conditions of the roads over which ambulances and transport had to travel behind the lines and gave reasons why a punctureless tire which still should retain resiliency, would be a comfort and a life saver in the ambulance service.

The conference will be in session through Wednesday.

Tractor Service Part of Salesmanship

Another Angle in Which Steps in Sale and Care of Machine Are Important

ST. LOUIS, Mo., Sept 13—"Service in the tractor business is largely a matter of salesmanship," says W. S. Roberts, manager of the J. I. Case T. M. Co. branch here. Mr. Roberts had been asked to give some advice to motor dealers who are going into the tractor business.

"Really, there is not much to service of tractors," he said, "and nothing should be promised except that the dealer will keep on hand a supply of parts that are likely to become useless through accident or wear. It is different from the automobile game, in that the present tractor men have not been promising the buyer upkeep of his machine and we want none of those abuses to enter the trade.

Believes in Education

"A buyer who is well sold has the service then in his hand. We believe strongly in education. We want the prospect to go over the machine to his heart's content. The more he examines it and the more questions he asks, the better we are pleased. He must get a complete and simple answer to all of these questions. As much as possible of this examining should be done before the machine goes into the field. Then his mind is cleared to grasp the necessary education in running the tractor. He should be instructed carefully and fully in the conduct of the machine. Keep a man who understands the machine with him thoroughly until he grasps the details. Show him the accidents that are likely to happen. Change the wiring while he is gone and let him find the trouble. Show him how to begin to find the trouble. No particle of education is wasted. It all comes back in a saving of service.

"After we have done everything possible in the way of oral instruction, we give to the new owner a sixty-five-page book in which all possible complications are met and in which all parts of the machine are treated as thoroughly as our engineers and field men know how. We go over this book with him and see that he understands it in general. One result of this is that the later correspondence, if any is necessary, is

intelligent. The book helps wonderfully with the care of the tractor.

"Nearly every tractor owner, like automobile owners, starts with the carburetor or the ignition to find trouble. It seems to be a fad. The fact is that he should start with the compression by turning the piston rods. These are things that he should learn during the first day of his ownership. If he understands these things, the foolish, exasperating and costly parts of the tractor service problem have been eliminated."

Mr. Roberts is not talking about motor car dealers without knowledge of them. While he is an implement man of long and thorough training, he knows the motor dealer, too. He has sold cars to him, and for the last year he has been studying the motor car dealer closely with a view to putting him into the tractor business. He has put several into business and is going to put more. His great hope is that they will make good, for he does not want them to hurt the tractor business and he does want them all to prosper in these war times, so that they will be personally content and their patriotism and bond buying ability will not be strained.

"The winter care of the tractor is perhaps the biggest single problem before the dealer and the owner to-day," says Mr. Roberts. "We are urging tractor owners to use their tractors as much as possible in winter. Use them for hauling manure, for hauling grain to market, for running feed cutters, meal grinders, sawing wood and the dozens of other things that power is required for. This is with a view of keeping the tractor in mind and having it cared for.

"Certainly there should be a store house for the tractor. It is like a motor car and totally unlike a steel portable engine or a steel separator. We often tell buyers of our all steel machinery that rain merely washes it off. But with a combination wood and steel machine it is different.

"It must be under shelter. Water will ruin a carburetor or the ignition and other points. Even in summer, if the tractor

stands out in a rain it should be covered. This was well illustrated by a Saturday afternoon downpour in St. Louis a few weeks ago. Something more than an inch of rain fell in one hard shower. That afternoon the streets were a parade of motor cars being towed to garages to have them dried out and started.

"Nearly every tractor owner is a motor car owner and he realizes these things for his motor car. He should be made to realize that the same things are true as to his tractor and he should give each the same care."

Another branch of the motor car service comes in connection with the operation in the field and this should be accounted for in the education. Mr. Roberts outlined it as follows:

"Some tractors are sold because they have great speed. Now all old tractor men know that this should not be a major selling point. Farm implements are made to be used at the speed a horse walks. Some can be adjusted to slightly higher speed but not many, and even these that can be so adjusted do not do their best work at high speed.

"Even the moldboard of a plow is adjusted to this speed, and when a plow is run faster it makes a rotten-looking job of plowing. I saw this fall plows used on a high speed tractor. When plowed that field looked like the earth had been thrown up and had come down. No farmer would have called it good plowing. The earth was not turned over, as it should be for best results.

"The higher speed may be all right for certain other purposes, but I have my doubts that the gain in speed even in hauling is worth the added strain to the vehicle carrying the load. It was not built for high speed."

BIG TRACTOR MEET WEST

Los Angeles, Sept. 13—When the third annual tractor demonstration is held here Sept. 17-21 motor car dealers will be more in evidence than ever before. Last year not half a dozen car dealers attended the demonstration, but many have begun to see the possibilities in this field and have stated their intention to attend this year despite the fact the demonstration will be conducted by the Traction Engine and Implement Dealers' Association of Southern California and only one Los Angeles motor

If You Store Your Tractor

It is the Case idea that a tractor should be much used throughout the winter or properly stored. Mr. Roberts gives the following rules as the Case idea of preparing a car for storage:

1. Clean the tractor thoroughly. All recesses and places containing dirt should be scrubbed with kerosene and brush.
2. Make absolutely sure that the cooling system has been drained and that not a drop of water remains in the pump or other places where it may freeze or rust and cause damage. Also drain out the fuel tank, carburetor and the entire fuel system.
3. Pour into each system a pint of heavy engine oil and turn the engine several times to spread the oil inside the cylinders. This should be done several times when the engine is cold to insure a coat of oil adhering to all surfaces. Give all parts within the crankcase and all finished parts around the engine a heavy coat of the same oil, being careful that cams, valve stems and all such parts are heavily coated.

4. Coat all exterior parts of finished surfaces, such as governor rod and magneto driveshaft, with heavy oil.

5. Coat all exterior finished parts of magneto with engine oil and wrap them up in paper. The first layer of paper should be soaked in oil but should not contain so much oil that it drips. Care should be taken to wipe the magneto thoroughly before starting the tractor again, and never allow oil to get on the platinum points.

If a tractor is not housed during the winter extra precautions should be taken to protect it from rust by proper oil coating and wrapping heavily all polished parts—magneto, etc.—after oil has been applied. It is important to use waterproof material for outside wrapping because if ordinary cloth should be used and become soaked it is much worse than none at all. A good canvas cover over the tractor after it has had the proper attention otherwise is a good protection.

car dealer is affiliated with that organization. Car dealers will be interested especially in sales and service methods.

For years an exclusive passenger car dealer, W. J. Burt is the newest Los Angeles convert to the tractor. Mr. Burt has acquired an agency. His place of business is particularly well adapted to render tractor service inasmuch as he has one of the largest machine shops in the city. He is the second motor car dealer in Los Angeles to add a tractor line.

The tractor demonstration will be held on a 600-acre field, and already the number of exhibitors approaches 150. Practically every make of tractor that was seen at Salina, Kan., will be in operation here, and in addition local products. It is said this will be the largest sectional display of tractors and accessories in the country this year. Manufacturers of farming machinery of all sorts will be liberally represented.

TRUCKS TO LESSEN COAL CRISIS

Birmingham, Ala., Sept. 14—Through the activities of the Birmingham Automobile Club and civic organizations of Birmingham a contract has been closed with the Jenkins Motor Co. to establish two motor truck lines within the next thirty days capable of moving 200 tons of coal daily from mines into Birmingham. Jefferson County supervisors have authorized 4 miles of public highway known as the Pump Station road and owners of mines in the immediate vicinity of Birmingham will spend several thousand dollars constructing roadbeds to connect their mines with the new highway.

The Jenkins Motor Co. will invest \$30,000 in two fleets of trucks, one to carry the output of coal from the mines in the Cahaba Fields, adjacent to the Pump Station road, and the other to handle an output of 100 tons daily from a mine in New Castle, adjacent to Birmingham.

It is estimated that the two motor truck lines will give Birmingham not less than 50,000 tons of coal this winter in addition to the regular coal moving by railroad to this point.

Service on Tractor Plows by Oliver

How the Company Works to Instruct Dealers and the System It Uses

SOUTH BEND, Ind., Sept. 13—"Service is my middle name," says Howard Seeley, sales manager of the tractor plow department of the Oliver Chilled Plow Works, South Bend, Ind. "I think about, dream about and talk about service all the time. It is the one great thing I try to impress the necessity for upon all our men, and upon the requirements for service our whole sales organization is built. Also I make as earnest an effort to place it as plainly before all of our dealers and in order to do so we are prepared to co-operate to almost any extent. It is the one big thing in our minds all of the time, for we know that without the right kind of service the farmer is not going to get the work out of his tractor and plow he has a right to expect.

"Our service is devoted to plows, of course, because plows are what we build and what we chiefly are interested in. At the same time this service of ours has a direct effect upon the degree of satisfaction a farmer gets from his tractor, because it happens that in nine cases out of ten where the work of tractor and plow is not satisfactory the farmer lays the blame on the tractor.

"While we build plows, nevertheless they are of no use unless the power which operates them works all right. The quality of the work depends upon the plow; the quantity and timeliness of the work depend upon the tractor. Now it is a fact that every tractor, provided it is not overloaded, will provide continuous power under average conditions, hence it is up to us to see that the other half of the unit, the plow, stands up to its work as well. It follows from this that our service on plows is essentially service on tractors, be-

cause if the farmer finds his plow performing satisfactorily he is pretty apt to find little if any fault with his tractor."

In working out this plan of service the Oliver Chilled Plow Works has covered the agricultural portion of the United States with branch houses and in the territory of each of these branches maintains as many subsidiary transfer stocks as the importance of the territory will justify in each particular case. For instance, the company has twenty-one branch houses located strategically in the chief distributing centers of the country. Each branch has a manager, an assistant manager, a full corps of blockmen and salesmen, and at each branch is carried a complete stock of plows and spares. Then with a view to making the possibilities of service more immediate and prompt transfer stocks are carried at lesser centers so that celerity in handling both complete machines and repair parts may be assured. The effect is that throughout the country the need never can be more than a short distance or a few hours away from the supply.

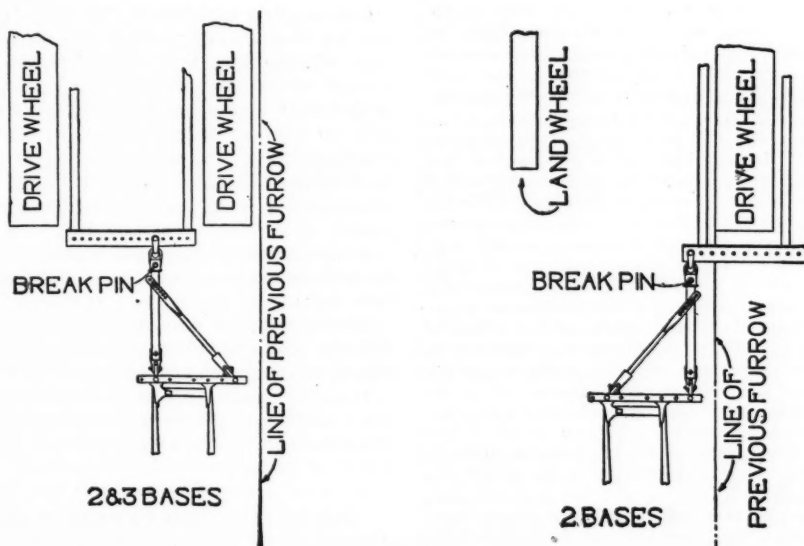
How this distribution of branches and transfer stocks works out geographically is illustrated in the following:

In Pennsylvania, for instance, there are one branch and eleven transfer stocks; in Indiana, apart from the factory itself, there are one branch and two transfer stocks; in Kansas one branch and ten transfer stocks; in Texas one branch and nine transfer stocks; in Illinois one branch and four transfer stocks; in Minnesota one branch and eight transfer stocks; in Nebraska one branch and six transfer stocks, and so on for the balance of the country.

300 Experts

Attached to the branches, in addition to the executive and clerical staffs, are more than 300 traveling men, blockmen and experts. Through these men service is brought to the individual, both dealer and farmer. The keynote of Oliver service is educational. Of course, many of the Oliver agents already are experienced in the plow business. Long years ago they served their apprenticeship. Most of these old dealers are able to take care of anything which may come up in their respective territories. Also the Oliver repair business is a lucrative department of the dealer's business in many sections of the country, and no special inducement other than this is needed to encourage dealers to carry ample stocks of repairs. Then the company lets it be known in many ways that it prefers that repairs be bought through its regular dealers rather than through other mediums.

But many dealers inexperienced in the plow business are beginning to sell tractors and plows. In the beginning these dealers require assistance and instruction. This is the function of the hundreds of Oliver men attached to the branch houses. They act under instructions from the home office to educate each new dealer in those things about plows which it is essential that he



At the left is the hitch attached to the plow and tractor when both wheels run on unplowed ground; at right, when drive wheel runs in furrow—a sample of instruction given by Oliver

should know. The object is to instruct him so thoroughly that it will not be necessary to see him again except in case of an emergency. Emergency calls are handled by the blockmen and experts, and these men are so numerous that prompt attention can be given to every request.

The printed matter issued by the company goes even further. It aims to instruct, not only as regards the construction, adjustment and operation of Oliver plows, but deals with the subject of plowing in a scientific and practical way. Times and methods of plowing are discussed. The advantages of timely plowing are explained so that the dealer may know not only the practice but the theory of plowing. Then dissertations on plowing, for some of them are all of that, give the dealer selling arguments which he can apply advantageously in his business.

Every plow when it leaves the factory has attached to it a carefully written and illustrated instruction folder. By following the directions in it the farmer commonly can adjust his own plow so that it will work properly. If he cannot, then one of the company men is available to help and instruct him.

This general service applies particularly to the line of tractor plows made by the company for use with any tractors. In the case of special plows, such as the No. 7, for instance, built for exclusive use with the Fordson tractor, in addition to the general service, each plow when it is shipped to the dealer includes a small box of repair parts. The selection of this assortment of repair parts is based upon experience and the probability that practically the same parts will be needed wherever No. 7 plows are used.

This briefly outlines the scheme of service of the Oliver company. It must be evident that it is as essentially tractor service as service would be which is devoted entirely to tractors, for the reasons set forth, that when the plow is adjusted properly and works satisfactorily the tractor itself is pretty apt to follow suit.

40,803 TRUCKS TO AN ARMY

Washington, Sept. 14—The personnel and equipment for motor transportation with each American army is to comprise nearly as many officers and men as were engaged on both sides in the battle of Waterloo, according to the War Department's plans. Each American army will have 154,747 officers and men, 40,803 motor trucks, 24,250 motorcycles, 7905 passenger cars and 6593 ambulances in motor transport work. By the time the United States has 4,000,000 men in France nearly 500,000 of them will be engaged in this work.

BRITISH ORDER FOR W.-O.

Toledo, Ohio, Sept. 14—Wilys-Overland has received an order from the British government for 10,000 semi-chassis for war purposes. The amount of the contract is around \$7,500,000, it is stated, which brings the total business of the company for the United States and its allies up close to the \$50,000,000 mark. It is understood that negotiations for important military work are still pending.

British Tractor Importers Protest Admission of Ford Only

CHICAGO, Sept. 13—British importers of tractors are up in arms against the action of the British government, which they say has prevented any tractors except the Fordson from being imported into England. A report to MOTOR AGE from London states that there has been much bitter discussion of the action of the government in allowing those tractors to be distributed through the regular Fordson channels while refusing to license the import of other types. The formal protest follows, but MOTOR AGE's informant does not vouch for the accuracy of its statements:

We, the undersigned independent importers of agricultural tractors, desire to call attention to and to register our protest against the unfair way in which we are being discriminated against by the Government in the interests of a rival firm whose manager until recently occupied a prominent position in the department which is, we understand, responsible for the action as the following facts will show:

Since the beginning of the year we have been prevented from ordering for import any tractors which have not already been sold to farmers, which, in view of the delay of several months with the condition of transport has rendered business virtually impossible. Moreover, the past two months, no importations have been allowed at all.

A year ago the government placed a large contract with Henry Ford for a new tractor to be built by him, at which time the independent importers were distinctly informed that in no case would these machines be placed on the market in competition with private firms but would be used exclusively for the government's own operation.

Offered by Agents

For some weeks past, however, the Ford company's agents all over the country have been offering these tractors extensively for sale for prompt delivery and on June 17, Mr. Prothero, replying to a question asked in the House, stated the government had released 1000 of these tractors for private sale, explaining that this had been done in order to satisfy unfulfilled orders.

The result is to throw the whole of the tractor business into the hands of one firm which, when the ploughing season commences next month, will be the only one in a position to supply, as no other firm can possibly supply tractors much before December, as the government has itself prevented the possibility of their obtaining supplies in anticipation of their requirements.

Apart from the gross injustice to ourselves who are virtually deprived of our business this section is grossly unfair to agriculturists and is against the best interests of the country, because the tractor in question is by no means suitable for obtaining the most economical results both in regard to labor and cost per acre on much of the land of this country, so the farmers are compelled by this action of the government either to accept and put up with a tractor which is neither so capable, so efficient, so economical to work, so thoroughly tried, or so safe to operate as some which other firms supply, or to do without the advantage of mechanical power for their work altogether.

The government is further refusing licenses altogether to import tractors of the latest and most improved types, even when customers are waiting for them, thus preventing British agriculturalists from obtaining the most up-to-date machinery, and in limiting the importation of tractors to those for which customers have already been found, has sedulously explained that it does so because there are too many unsold

tractors in the country already, which is contradictory to its action in releasing this large number of tractors "to satisfy unfulfilled demands."

In conclusion we desire to point out the best for the enterprise of the independent firms there would have been no tractors available here during last year and the year before and that they have been entirely responsible for the development of the interest in and the extensive employment of these labor-saving appliances by farmers today, and it is monstrously unfair that the results of our labor should be taken from us and given to a new firm which has never made commercially, or marketed, a tractor before.

TRUCK DEALERS ON BANDWAGON

Boston, Mass., Sept. 14—That the passenger car dealers who got on the truck bandwagon in Massachusetts some time ago saw the handwriting on the wall and knew where their best interests lie is shown by the registration figures just given out by the Massachusetts Highway Commission for the first eight months of this year. Taking the registrations for Jan. 1 to Sept. 1 this year and comparing them with the figures for 1917, it shows that for every passenger car listed in the former period there was registered 1½ trucks, or 16 trucks for every 10 cars.

It is the best answer to the talk that passenger cars are pleasure vehicles, for undoubtedly some of the machines listed in the truck column were former passenger cars, or passenger cars now being used for business purposes. Last year there were registered in Massachusetts 148,266 cars. Up to Sept. 1 this year 151,818 cars were listed, or 3552 more than the entire 1917 figures. In 1917 26,008 commercial vehicles were listed and for the first eight months of this year 31,649 were registered, or a gain of 5641. That is 2089 more commercial vehicles than passenger cars. If a comparison is made between the first eight months of 1917 and the same period of this year the figures are 136,417 and 151,818 cars respectively, and 24,025 and 31,649 trucks. That was 15,401 cars gained and 7624 trucks.

ONTARIO TRACTOR MEET SOON

Cobourg, Ontario, Sept. 13—The great tractor, truck and power demonstration that will be held here Sept. 17-20 is expected to be the greatest exposition of farm power equipment that has ever been held in Eastern North America. Various demonstrations of a similar character have been held in Canada during the last few years but never on the scale developed this year.

A hundred tractors will be demonstrated, as well as tractor plows and all kinds of farm machinery driven by belt power.

Efficiency tests will be attempted, but nothing of a spectacular nature will be allowed, and there will be no prizes.

The exhibition of tractor accessories will also be a feature of the demonstration. Beginning at 1 o'clock in the afternoon, there will be 2 hr. of public demonstration.

CURTISSE ENGINES FROM W.-O.

Washington, Sept. 12—The Willys-Overland Co. has received a contract for 1500 Curtiss OX-5 airplane engines of the eight-cylinder type, to be used in training planes.

Dealer Activities of Week in Brief

Two Shows Called Off—Wisconsin Forms N. A. D. A. Branch—May Close Oil Stations

WASHINGTON, Sept. 12—Following the cancellation of the national shows of 1919 by the National Automobile Chamber of Commerce, the War Industries Board urges promoters of local shows for cars, trucks or accessories to abandon all plans for such during the coming winter to save fuel, labor and transportation. An official statement issued by the War Industries Board here today says that the National Chamber of Commerce cancelled its 1919 shows at the request of Bernard M. Baruch, chairman of the War Industries Board, and George N. Peek, commissioner of finished products.

The conference was held recently between members of the War Industries Board and Hugh Chalmers and Alfred Reeves of the N. A. C. C., at which time Mr. Peek urged that all such exhibitions be abandoned for the winter.

NO ST. LOUIS FALL SHOW

St. Louis, Mo., Sept. 16—There will be no truck and tractor show in St. Louis this fall. That was the decision reached at the weekly meeting of the Commercial Car and Service Association. The chief reason is that local branch managers and dealers fear they cannot get a surplus of trucks to make an exhibit. They are selling more than they can deliver as it is. Another reason is that there is no building available and the truck men think the Government would not look favorably upon the plan to ship a tent around and engage labor, etc., to erect it.

CHICAGO TRUCK SHOW OFF

Chicago, Sept. 15—The truck show which the Chicago Automobile Association had under contemplation for the Coliseum this winter has been abandoned. A canvass among the truck, road tractor and truck-unit manufacturers indicates that 75 per cent of them are opposed to a truck show this fall. The opinion prevailed that with the unusual conditions confronting the industry a truck exhibition would be inconsistent, highly impractical and not in keeping with the spirit of the times.

WISCONSIN DEALERS ORGANIZE

Milwaukee, Wis., Sept. 14—A Wisconsin branch of the National Automobile Dealers' Association was organized on a temporary basis at a meeting of state dealers which followed a luncheon given by the Milwaukee Automobile Dealers' Association Wednesday. Another meeting will be held in about a month, at which a permanent organization will be effected. In the meantime an organization committee consisting of one representative dealer from each of the seventy-one counties in Wisconsin will do local promotion work and conduct a membership campaign.

The Milwaukee association sent invitations to approximately 1700 dealers. The dinner was attended by more than 300, of which nearly 700 already were members of

the National association. Almost every one of the remaining 200 signed a membership application.

F. W. A. Vesper, president, and E. E. Peake, executive secretary of the N. A. D. A., were the guests of honor. It was the result of their enthusiastic endeavor along the lines of organization that there was practically a 100 per cent response to the call for members. Effective work also was done by Bart J. Ruddle, national secretary, who is assistant secretary and manager of the Milwaukee association.

VESPER COMES BACK CHEERED

St. Louis, Mo., Sept. 16—President F. W. A. Vesper of the N. A. D. A. was in high spirits Friday when he returned from Milwaukee and Chicago, where he had addressed the Wisconsin Automobile Dealers' Association and the Overland branch managers. He said that the spirit shown by the dealers under the adverse circumstances confronting them was simply wonderful.

"The Wisconsin meeting in Milwaukee was held under extremely bad circumstances. Three days of cold, wet weather had made the state fair a most discouraging proposition. No one could feed the

party at noon, so we met in assembly hall and held the session until 2:30 before we went to dinner.

"It was the first meeting I had attended since Ford, Hudson and others had announced no more passenger cars. I was a bit fearful. Certainly the gathering did not look cheerful at the beginning. But when we got together some speeches were made and the party heard of the troubles other folk are having, it was amazing how they thawed out. By the time the dinner was over, those men without a prospect of making their living in the months to come were throwing napkins in the air and cheering. More than 150 membership applications to the N. A. D. A. were signed in the hall. There will be more.

"The spirit was: 'Never mind us. We will lock up our salesrooms if necessary, rent a farm and eke out a living, just so the war is won. Then we'll come back stronger than ever.'

"The Overland meeting developed in a good deal the same way."

GARAGES TO CLOSE EARLY

Philadelphia, Pa., Sept. 14—The Philadelphia Garage Association will close all gasoline tanks and service departments of members at 8 p. m. daily, beginning Monday. The purpose is to conserve fuel, electric light and man power. Only such lights as are essential to the safety of owners of cars returning their machines will be left burning in the garages.

The movement was decided on at a meeting of the association attended by 150 members. It was pointed out that if such action were taken by garagemen throughout the country, enormous saving of fuel and light in the aggregate would result.

WAR BOARD MAY TAKE HAND

St. Louis, Mo., Sept. 16—A letter from the War Industries Board to President F. W. A. Vesper of the N. A. D. A. indicates that the proposal of making official the Sunday closing of oil and service stations is receiving the serious consideration of that body. The letter implies that the order is likely to be made with penalty attached.

A N. A. D. A. ARGUMENT

St. Louis, Mo., Sept. 16—The Overland Automobile Co. of this city, in a recent letter on trade subjects to its dealers, added this paragraph:

"The National Automobile Dealers' Association is representing you at Washington, and if you are not already a member of this association we would urge that you fill out the enclosed blank and attach your check for dues, forwarding the same to the Secretary of the National Automobile Dealers' Association, 3530 Lindell Boulevard, St. Louis, Mo."

Price Increases

Detroit, Sept. 14—The new price of both the Hupmobile touring car and roadster is \$1,500 instead of \$1,350. This advance was effective Sept. 1.

Detroit, Sept. 14—The Packard Motor Car Co. has advanced its prices, effective Aug. 26, as follows:

| MODEL | OLD PRICE | NEW PRICE |
|----------------|-----------|-----------|
| 3-25 touring | \$4,300 | \$4,800 |
| 3-25 limousine | 5,850 | 6,350 |
| 3-25 brougham | 6,000 | 6,500 |
| 3-25 coupe | 5,650 | 6,150 |
| 3-35 touring | 4,650 | 5,150 |
| 3-35 limousine | 6,200 | 6,700 |

Detroit, Sept. 14—The Hudson Motor Car Co. has advanced the prices of the Super-Six \$250, effective Sept. 1, as follows:

| | |
|-------------------------|---------|
| Seven-passenger phaeton | \$2,200 |
| Four-passenger phaeton | 2,300 |
| Sedan | 3,000 |
| Runabout landau | 2,690 |
| Limousine | 3,650 |
| Town car | 3,650 |
| Coupe | 3,100 |
| Town limousine | 3,400 |

Hartford, Wis., Sept. 13—The Kissel Motor Car Co. has increased the price of its cars and trucks as follows:

| MODEL | NEW PRICE | OLD PRICE |
|-------------------------|------------|------------|
| General utility, 2-ton. | \$2,073.00 | \$1,885.00 |
| Freighter, 2½-ton. | 2,832.00 | 2,575.00 |
| Heavy-duty, 4½-ton. | 3,905.00 | 3,550.00 |
| Dreadnaught, 6-ton. | 4,785.00 | 4,350.00 |
| 4-pass. tourster | 2,550.00 | 2,250.00 |
| 7-pass. touring | 2,550.00 | 2,250.00 |
| 4-pass. speedster | 2,550.00 | 2,250.00 |
| 5-pass. touring | 1,644.50 | 1,585.00 |
| 5-pass. Gibraltar | 1,743.50 | 1,495.00 |
| 5-pass. sedan | 2,128.50 | 1,995.00 |
| 5-pass. victoria | 2,475.00 | 2,085.00 |
| 4-pass. sedan | 2,293.50 | 2,085.00 |



General view of the exhibition at the Municipal pier, which was more than 1000 ft. long

Chicago Automotive Show Opens

Trucks, Tractors and Accessories on Display
at Municipal Pier This Week

By Darwin S. Hatch

CHICAGO, Sept. 16—The Second Annual National Exposition of Trucks, Tractors and Accessories, which opened at the Municipal Pier Saturday evening demonstrated that its promoters had discovered a place to hold automotive exhibits which surpasses in many respects the Coliseum. Aside from that it has not demonstrated much of anything, unless it be the futility of attempting to draw a crowd to a display of this kind in these war times.

To say, after two evenings and one day of the show that it is not a success from an attendance standpoint is premature, but if the Saturday night and Sunday attendance should be taken as a criterion of the number of visitors for the week, the aisles will not be overcrowded. Somewhere near 250,000 free tickets have been given out and a number of big days are scheduled, so that it is to be expected that there will be a larger proportionate increase in the attendance later in the week than the usual increase over the figures for the opening days.

Exhibitors on Opening Night

Saturday night there was a total of 106 exhibitors, seventy-eight of whom showed parts and accessories. Six complete trucks are shown, two truck-formers, four farm tractor exhibitors and four tractor parts, one industrial tractor, one road tractor, one house-lighting system and ten miscellaneous displays, including the Red Cross, State of Wisconsin agricultural exhibit, Cook County school and some farm papers.

Of this 106 there are twenty-one who did not have their displays on hand Saturday evening. Probably the total number of displays has been increased by a few since the opening day, because there were a number of blank spaces which did not even have their signs up until this morning and could not be included in the census.

A discrepancy between the actual count of exhibitors and the upward of 200 which preliminary announcements of the show management stated would be on hand comes in partly through the fact that, in its list of exhibitors, the show management in many instances listed the jobber and manufacturer of the products he was exhibiting as two separate exhibitors. Some of the jobbers showed the products of a number of manufacturers. The Gray-Heath Co. is the best example of this, carrying the signs of a dozen different manufacturers, as co-exhibitors with it and having the products of perhaps twice as many manufacturers on view.

According to reports received by B. L. Gray, treasurer of the Automotive and Accessories Exposition, Inc., which is putting on the show, 407 jobbers and dealers had signified their intention of visiting the exposition. The show was staged at the proper time for an exhibition which appealed to jobbers and dealers, because it comes at just the time when the jobbers are getting ready to make up their catalogs for the new season.

Saturday's paid admissions amounted to about half of the first day's receipts of the Ford accessory show last year, which was the predecessor of the present one. This would mean that about \$90 worth of fifty-cent admissions were sold. Although the gate receipts do not indicate the attendance, on account of the preponderance of free tickets which were distributed, they are an index of the desire of visitors to see the show.

Sunday's attendance was not much of an improvement. A personal count made by a staff member of *MOTOR AGE* at 5 o'clock Sunday afternoon tallied 380 people, including exhibitors, attendants and visitors, and also including the fifty or sixty people who were in the free moving picture show run in connection.

Gasless Sunday Had Effect

The fact that it was a gasless Sunday reduced the attendance of motorists, and the fact there was a band concert on the pier at that hour also may have had its effect, as there was considerable increase in attendance after the concert was over, on account of the free tickets that had been distributed there.

During the show, which closes next Saturday, special features on three days may bring up the attendance. Wednesday is to be Illinois day and will be under the auspices of the Illinois Highway Improvement Association and Ex-governor Dunne will speak. Thursday there will be a convention of thresher men and Friday of hardware jobbers.

The exhibition takes up about half of the 2400 ft. of the north side of the upper floor of the Municipal pier, giving an exhibition space 66 ft. wide and between 1000 and 1500 ft. long. It has been tastefully but not heavily decorated with gold and white pillars and railing about the exhibit booths, with the flags of America and the Allies as a predominating note in the hangings. These are intertwined with festoons of evergreens and roses. Along the side walls are painted canvases depicting the industrial life of America in agriculture and transportation from the earliest days of the oxen-drawn plows up to the present time of mechanical efficiency.

The Gray-Heath exhibit was the largest and most complete line of accessories at the pier. There are some particularly pleasing arrangements of booths, the Rayfield carburetor exhibit being probably the most attractive.

The exhibit of agricultural implements was limited to two disks and a plow attached to the three Fordson tractors shown by the Rue Motor Co. The chief tractor part exhibitor is the Foote Bros. Gear & Machine Co., with its planetary tractor gearset. The Mercury Mfg. Co. had one of its industrial tractors on display, and the One-Wheel Truck Co. had a road tractor.

Motor trucks shown were the Winther, Muskegon, Traffic, Forschler and Tower.

Tractors at the Pier

ONE tractor attachment and four tractors comprise the tractor section of the show on the pier. The first is the Guaranteed Tractor Corp., Chicago, and the last are the Inter-State Tractor Co., Waterloo, Iowa; La Crosse Tractor Co., La Crosse, Wis.; Rue Motor Co., Chicago, showing the Fordson, and Craig Tractor Co., Cleveland, Ohio.

La Crosse has the only live exhibit, the special tractor made for this show being run with an electric motor. Cut cylinders show piston and valve operation.

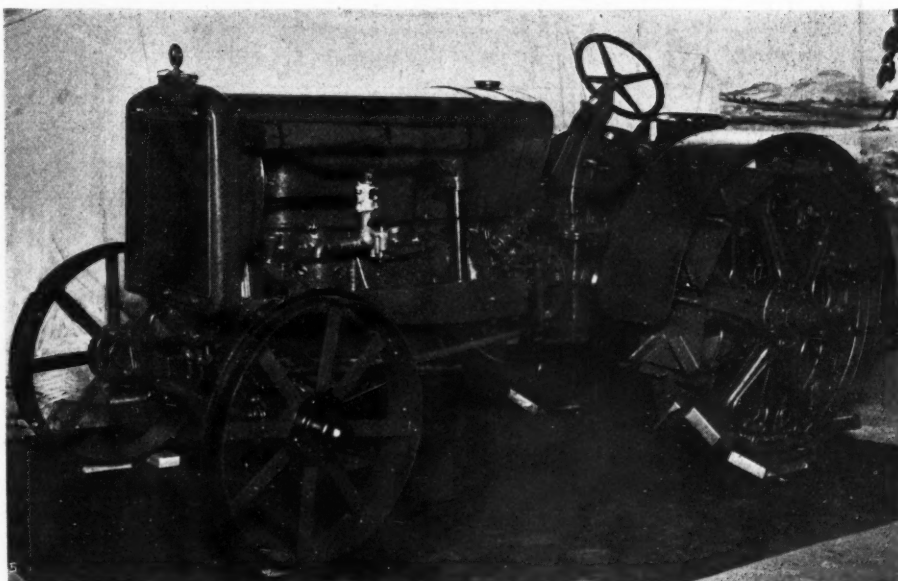
The Craig is making its initial bow to the public. This is the newest tractor on the market and evidently has been designed without regard to cost, as it will sell for better than \$2,000. It is a 15-25, three-pow, four-wheel tractor, inclosed type and with pad wheels. The design makes features of accessibility, comfort of operation and ease of control. The engine in the Craig is a $4\frac{1}{2}$ by 6, four-cylinder vertical, valve-in-head and burns kerosene. The normal speed is 950 r. p. m. Lubrication is pressure feed to main and connecting rod bearings with splash for other engine parts. Regular equipment is Modine-Spirex radiator of oversize, Berling high-tension magneto, Pharo centrifugal oil governor and Bennett air cleaner. It has a selective gear Nuttall gearset, running in oil, all gears forged and cut and equipped with Timken bearings. Final drive is a live axle. The rear wheels are the P-T type, 44 by 12 in., with 540-sq.-in. wheel area on the ground. The front wheels are 32 by 6 in., with non-skid flange and Timken bearings. The wheelbase is 88 in.; length, 129 in.; width, 78 in., turning radius, 17 ft. It has $2\frac{1}{4}$ by $3\frac{1}{2}$ m. p. h. forward speed and one reverse. The Craig is spring mounted in front and weighs 4500 lb.



The decorations are tasteful with flags the predominating feature



The Forschler dual-frame motor truck exhibit at the pier



Craig tractor which is on display for the first time

Tractors in Mile-Long Parade

Milwaukee State Fair Sees Fifty-four Machines and Equipment in Line

MILWAUKEE, WIS., Sept. 13—Recognition of the importance of the tractor exhibit at the Wisconsin state fair took the form of a mile-long parade of tractors and power-farming equipment which traversed the grounds and passed in front of the speedway grandstand this afternoon. Fifty-four tractors, representing twenty tractor manufacturing concerns, were in line.

However, from the standpoint of the thousands of people who saw the parade, interest centered in the demonstration of the versatility of the tractor; the ease with which it can be adapted, in one or more of its various forms, to practically all the drawbar work of the farm.

Practically every implement commonly in use on the diversified farm was pulled by some tractor in the parade. There were plows, disks, land rollers, seeders, drills, cultivators, mowers, binders, corn harvesters and wagons. The parade brought out the fact concretely and forcibly that the tractor is able, by reason of its adaptability, to do practically all the farm work which hitherto has been done by horses.

In short, the parade was an eye-opener. Never before was such a comprehensive demonstration of tractor-drawbar versatility shown to such a crowd as usually comes to a state fair. Probably a majority of the people who saw the show, if ever they had thought about a tractor at all,

had thought about it as a machine intended primarily for pulling a plow. The idea that it could be applied to every other drawbar task on the farm with equal facility has not been common. Just as probably thousands of the people who were on the fair grounds to-day have gone home with a vastly more comprehensive notion of what a tractor can mean on the modern farm than they ever had before.

The following tractor concerns had tractors in the parade: Dauch Mfg. Co., Sandusky, Ohio; Trenam Tractor Co., Stevens Point, Wis.; J. I. Case Threshing Machine Co., Racine, Wis.; Turner Mfg. Co., Port Washington, Wis.; Rock Island Plow Co., Rock Island, Ill.; Moline Plow Co., Moline, Ill.; Avery Co., Peoria, Ill.; Beeman Garden Tractor Co., Minneapolis, Minn.; Eagle Mfg. Co., Appleton, Wis.; La Crosse Tractor Co., La Crosse, Wis.; Lauson Mfg. Co., New Holstein, Wis.; Allis-Chalmers Mfg. Co., Milwaukee, Wis.; International Harvester Co., Chicago; Townsend Tractor Co., Janesville, Wis.; U. S. Tractor & Machinery Co., Chicago; Emerson-Brantingham Co., Rockford, Ill.; National Tractor Co., Cedar Rapids, Iowa; Monarch Tractor Co., Watertown, Wis.; Cleveland Tractor Co., Cleveland, Ohio; T. J. Mickeljohn, the Fordson, Fond du Lac, Wis.

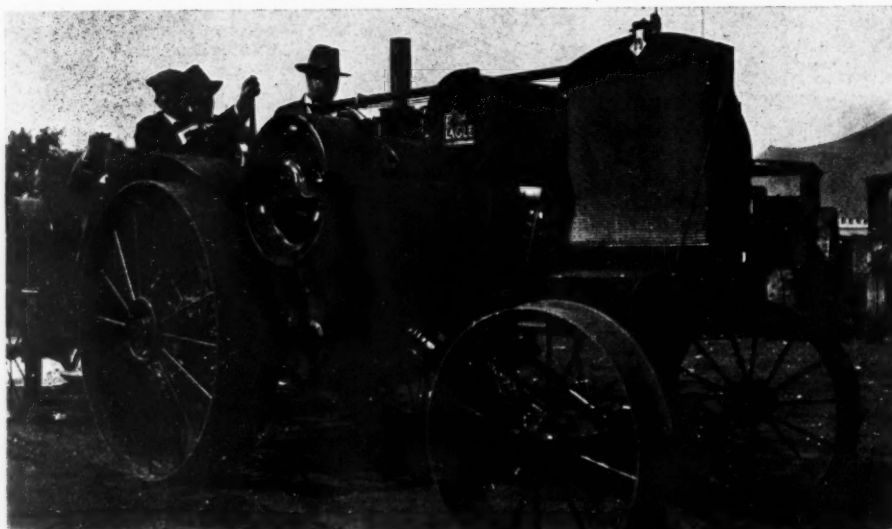
Columbus on Exhibit

The Columbus Tractor Co., Columbus, Ohio, had a tractor on exhibition but did not enter its machine in the parade.

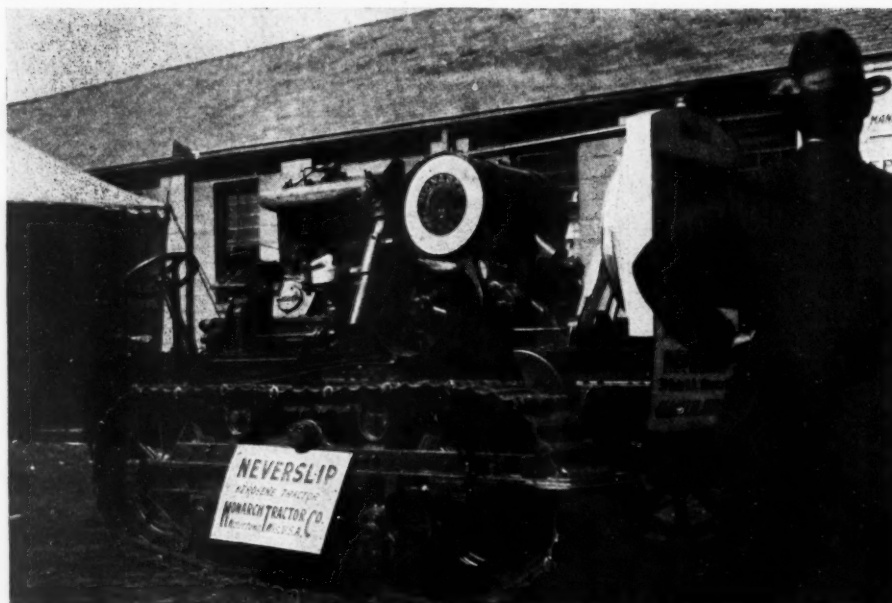
It is well for the tractor manufacturers who made exhibits at Milwaukee that they were given at least one opportunity to occupy the center of the stage, for scant consideration was given to them in other respects. The location and arrangement of the tractor display as a whole hardly could have been worse. The display was scattered and disorderly, some of it obscurely placed and as a whole side-tracked, as it were, for other exhibits and concessions of less relative importance in an agricultural event. The portion of the grounds conceded to the tractors, and upon which the tractors were compelled to maneuver, if indeed, they maneuvered at all, recently had been filled and graded and was so soft that some of the machines almost dug their own graves. Location and unfitness of display grounds both detracted from the value of the exhibition for the manufacturers and from the interest of the visitors.

Most of the exhibitors expressed themselves as much dissatisfied over the arrangements this year. However, steps will be taken at once, instigated by the Wisconsin Power Farming Association, to the end that adequate recognition and a location commensurate with the importance of the tractor exhibit be given next year.

Plowing demonstrations outside the fairgrounds were planned to be a daily feature. Owing to unfavorable weather conditions and poor arrangements for this also, these



The Eagle tractor, with twin-cylinder, horizontal-opposed engine



Right side of Monarch, a creeper type of tractor

were seriously interfered with. However, some plowing was done, and always in the presence of an interested crowd.

There were several new tractors on the grounds, and others not so new but almost as unfamiliar to most. Among the new machines were the Trenam, manufactured by the Trenam Tractor Co., Stevens Point, Wis., and two models manufactured by the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

The Trenam tractor is practically a two-wheel tractor, although it has a third wheel, of caster type, in the rear. The caster wheel, however, is back of the supporting frame of the tractor and serves merely as a support for the operator and as a fulcrum from which the steering gear is worked. Its support also affords an attachment point for the drawbar. Final drive is chain.

The Trenam is rated as a 12-24, with a 4 by 6-in. valve-in-head, four-cylinder, vertical engine with 900 r. p. m. It has two speeds forward, $2\frac{1}{2}$ and $3\frac{1}{2}$ m. p. h., and a low-speed reverse. It weighs 4200 lb., 90 per cent of which is carried on the drive wheels. The back of the tractor frame proper is in shape like the segment of circle, and the tractor steers by turning the tractor rather than the caster wheel. This feature is unique with the Trenam.

The 10-18 Allis-Chalmers is a three-wheel tractor with $5\frac{1}{4}$ by 7-in., two-cylinder opposed engine. The caster wheel is in front and, with one of the drive wheels, runs in the furrow. The machine weighs 4800 lb., with two speeds forward and reverse. A feature of this tractor is the one-piece, heat-treated frame, which has neither bolts nor rivets and which is designed to withstand without sagging the heaviest strain which can come upon the tractor. All the bearings are inclosed. Final drive is internal gear. This tractor operates on either gasoline or kerosene.

The Allis-Chalmers

The Allis-Chalmers All-Purpose farm tractor is a two-wheel machine, very suggestive of the Moline-Universal but lighter in weight and of smaller capacity. It is a one-bottom tractor, rated at 6-12. The model shown at Milwaukee has a $3\frac{1}{8}$ by $4\frac{1}{2}$ -in., four-cylinder vertical Leroi engine, although this is not the type of engine which ultimately will be adopted. The transmission is a sliding-gear type of the company's own design, and final drive is internal roller pinion. The engine has a normal speed of 900 r. p. m. The machine weighs about 1700 lb., has a speed of $2\frac{1}{2}$ m. p. h. forward and reverse and will sell around \$750.

Other tractors which were not familiar to most of the visitors were the Monarch, a creeper; the Townsend, which looks just like a miniature locomotive; and the Eagle. Both the latter are of four-wheel type and have twin-cylinder, horizontal-opposed engines.

HIGHWAY DIRECTORS TO MEET

Washington, Sept. 14—A meeting will be held here commencing Tuesday, Sept. 17, and continuing three days, between the Highways Transport Committee, Council of National Defense, which is headed by Roy D. Chapin, and the eleven regional directors. Numerous other Government officials will attend, including cabinet officers, railroad and food administration officials, mem-

bers of the Shipping Board, War Industries Board and Army officers. Discussions will be chiefly about the use of the highways and motor trucks during the coming winter months. At the same time Mr. Chapin hopes practically to complete the organization he created at the command of the Council of National Defense and which now has a country-wide scope of operation.

The Highways Transport Committee, in addition to its co-operative work with the Quartermaster Department convoy system, has engaged importantly in developing the rural express, return loads bureaus, store-door delivery and general highways transport, and it will be these subjects that will be taken up in detail at the meetings.

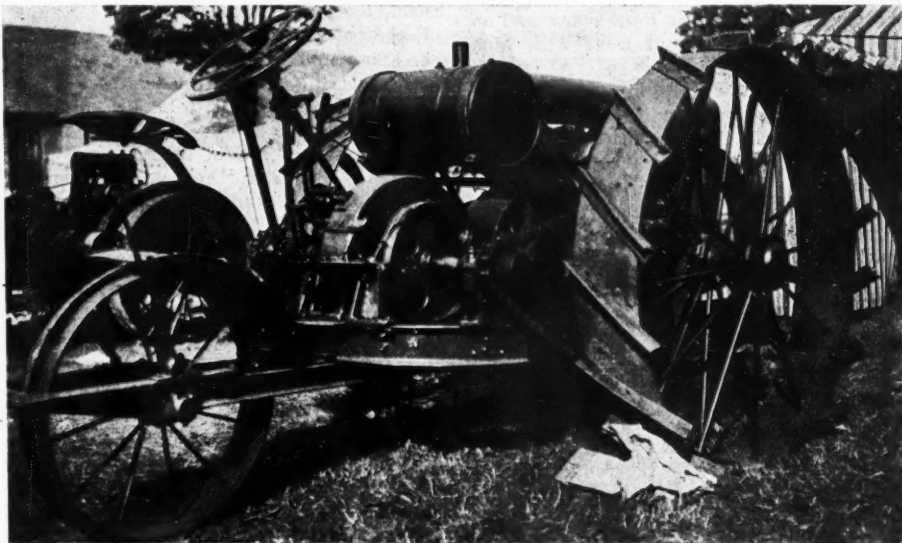
FREE SERVICE BOOKS GOING

Boston, Mass., Sept. 14—Some of the Boston motor car dealers handling passenger cars are confronted by another problem that is giving them some worry. When they sold their cars some months ago they had the free service book plan in vogue, which entitled owners to so many hours of free overhauling from time to time during a year. At the time some of the books were

issued the charge for labor varied from 75 to 90 cents or \$1 per hour. Now the labor price has gone up approximately to about \$1.25 an hour. The issuing of the books to owners was a contract just as binding as if it were signed by both parties, and there were no qualifying clauses regarding prices contained in them.

When owners come in for free service with their books they have to be recognized, and with the shortage of help, the higher prices and the dropping off in business due to curtailment of cars some of the dealers are wondering just how to handle the situation. If they should try to tack on the extra price, the owner legally could refuse to pay it. With factory officials in some instances urging the dropping of all free service the burden of handling the enigma falls upon the shoulders of the dealers. Whether to grin and bear it or try to get owners to recognize the necessity of paying the extra cost between what was charged when the books were issued and present prices will need some diplomacy.

The end of the free service book is in sight, anyway, for they are not being issued any more.



The Trenam tractor, practically a two-wheel type



The Allis-Chalmers General-Purpose tractor at Milwaukee



Walter G. Duke, tractor dealer, is the man on the left. The other is Frank S. Masters, a Brookville, Ind., dealer

RUSHVILLE, Ind., Sept. 13—Within 5 min. after the telephone call came in Walter Duke was in his Ford sedan and on his way to the farm. I went with him. On the way he talked.

"This fellow we're going out to see hasn't any more mechanical sense than a rabbit," he said. "He can tinker around all right with a plow or a cultivator, but when it comes to doing things to his tractor he throws up both hands and hollers 'Kamerad.' He's had a tractor for some time, but actually he doesn't know much more about it now than he did the day he bought it. It's been standing in the shed for some time now, and I'll bet a dollar that when we get there we'll find he is having some trouble with the ignition and that he can't get his machine started.

"You see, Brown, that's his name, is going to furnish the power, while a neighbor of his is to provide the fodder cutter, and by hooking up in that way they both will get their fodder cut. Brown was to have been over there this morning with his tractor and it's now afternoon and he hasn't left his farm yet. It's dollars to doughnuts he can't.

Lack Mechanical Sense

"You know, there're a lot of farmers like that. They lack mechanical sense, or they're afraid to do things to their tractors, or they won't try, or something, but anyway it makes a lot of trouble for the tractor dealer. Those fellows will 'phone in when the least little thing goes wrong and then they expect you to drop everything and start for their farm on the jump, just like that. Why, I drove 14 miles the other day just to tighten a set screw.

"Now the tractor dealer can't afford that sort of thing. He's got to draw the line somewhere. If he starts this free service business he'll be hounded to death and every time he turns a farmer down he starts a grouch. I've got it solved, though. Took me some time to dope out a plan but I've got it now, and every man who buys a tractor from me knows just where he gets off on this service question. He knows just how much free service he is going to get and just when he must begin to pay for it. It

Covering a Territory With a Sedan

How Tractor Dealer Gives Emergency Treatment to Owners in Two Counties

By Fred M. Loomis

Motor Age Editorial Staff

works fine too. I'll tell you about it when we get back to the office. There's Bill now monkeying around his machine. Hello, Bill, what's the trouble now?"

"Can't get the darned thing to go," grinned Bill sheepishly.

"All right, let's see what the matter is."

Mr. Duke's prognosis was correct. It was the ignition. While the tractor had been standing in the shed the battery contacts had corroded. Then when it was run into the shed the spark plugs were dirty and "Bill" hadn't taken time to clean them just then. Some dirt also had gotten into the interrupter.

A monkey wrench and a jackknife were about all the tools Mr. Duke used. He scraped off the battery contacts, took out the spark plugs and dug the carbon out of them, opened the interrupter and scraped off the points, then he turned her over and she started off with a purr like a contented kitten. "Bill" got on the seat and started for his neighbor's farm 6 hr. behind schedule, just because he didn't know.

"Now you see," said Walter—everybody calls him Walter, for he's got that sort of personality, you know—"Now, you see, it was just what I told you. I didn't do a thing Bill couldn't have done just as well and just as he ought to have known how to do. Those spark plugs ought to have been cleaned when the tractor was run into the shed after the spring work was done. But they weren't. To-day Bill ought to have known enough to scrape those contacts and do the other things I did. But he didn't. That's just how the tractor dealer loses time, money and patience running out any old distance to do some monkeying around with a wrench and a jackknife, just like I did to-day. But, as I said, I've got that all fixed now. Come on in and I'll show you how I do it."

When Mr. Duke sells a tractor to a farmer

he gives him a book of forty coupons, each coupon good for half an hour's time, or 20 hr. in all. These are based upon a service charge of \$1 per hour, so that the book represents really \$20 worth of free service. The coupons are redeemable in service any time within twelve months from the date the tractor is sold and delivered. When the purchaser calls for service, after the initial visit to start the machine, and Mr. Duke or his service man starts for the farm, time is reckoned to begin when the car leaves the warehouse and continues until the job, whatever it is, is completed on the farm. When the job is done coupons covering the time are detached. When all the forty coupons are used up free service ends, and subsequent service is charged at the \$1-an-hour rate.

As will be noticed from the reproduction of the front and rear covers of the coupon book shown herewith, the front bears the name of the purchaser, the serial number of the tractor and a serial number to correspond with the number printed on the coupons inside. The back cover is an agreement which the purchaser signs accepting the coupon book in lieu of all free service and agreeing to abide by the conditions he signs.

The System Works

"It works just fine," says Mr. Duke. "Some of my customers, like the man we saw to-day, use up all their coupons in hurry. Others never will use all of them. You see, when a man knows that there is a limit to free service and that when he has reached that limit he will have to begin to pay, he's mighty careful not to call me out for silly things and not more than once will he make me drive 14 miles just to tighten a set screw. Anyway, I tell my customers that whenever they find a nut loose to tighten it. I tell them also to keep their tractors under cover and to give them



The office of Walter G. Duke is wherever he happens to be, but his tractors are displayed here

good care if they want to get good service out of them. I tell them to use their brains a little, and the sooner they do the sooner they will become expert tractor operators.

"Another thing I do. While I sell for cash only I always make a regular contract with the farmer. Of course, as soon as the tractor is delivered the contract is fulfilled and the farmer usually doesn't care whether he has a copy or not. I give him a copy if he wants it, but I keep the original. Here's one, and you will see that on the lower right hand corner the farmer is completely located. When a 'phone call comes in, if I don't know just where that farmer lives, a glance at my contract gives me his place and tells me just how I can get there the quickest. You see, I never keep the farmer waiting for anything. I'm Johnny on the spot in getting there myself, or in getting my service man there, and I carry a stock of repair parts as large if not larger than the company has at its branch house in Indianapolis. It's up to me to keep every tractor in my territory running all the time, and I do it. Maybe that kind of service doesn't help to sell tractors, too?"

Mr. Duke hasn't got much of an office now, in fact, it's practically under his hat. He started to build a warehouse, 165 by 20, but the plans did not suit the state fire marshal and operations are stopped pending a revamping. The building likely will be completed, however, before snow flies. For the present he has storage space rented in a nearby garage, and his office is just wherever he himself happens to be.

He uses a Ford sedan, with boot crammed with the necessary tools for all sorts of emergency service, and in this machine he travels his territory of two counties in all sorts of weather. Incidentally it might be just as well to say that Walter G. Duke is located at Rushville, Ind., and sells the Moline-Universal tractor. He has sold seventy-one of them already this year and has placed his order for 100 with which to start off the season of 1919. He has orders for fourteen of his 1919 allotment in his brief case now. Next year he will handle also the power equipment of Moline make which goes with tractors, including plows, disks, harrows, mowers, binders, etc.

Mr. Duke is an exclusive tractor dealer. He devotes his entire attention to tractors. Once upon a time he trifled a little with motor cars, so got an automotive slant to his inclinations in that way. But when he went into the tractor business he was a grocer. Selling strictly for cash and refusing to trade in spavined horses or decrepit farm equipment, he makes, what with the liberal agency discount he enjoys, a mighty good thing out of the tractor business.

WISCONSIN DUPLEX CHANGES

Oshkosh, Wis., Sept. 14—The Wisconsin Duplex Automobile Co., Oshkosh, Wis., which recently completed development work and is now engaged in a regular production of commercial chassis, has changed its corporate style to The Oshkosh Motor Truck Mfg. Co., and adopted the trade mark of Oshkosh for its product. The principal object of the change is to give due recognition to the city where the truck is being made, and also to avoid confusion with ex-

SERVICE COUPON BOOK

WALTER G. DUKE

Rushville, Indiana

GOOD FOR 20 HOURS LABOR

Issued to

Tractor No. Book No.

NOT VALID UNLESS COUNTERSIGNED BY W. G. DUKE.

Mr. owner of Tractor, Serial No. Motor No., purchased from WALTER G. DUKE Rushville, Indiana, the day of 191... acknowledged receipt of Coupon Book No. containing Coupons to the value of TWENTY HOURS LABOR, when presented at any time within twelve (12) months from date of purchase indicated above.

The owner accepts these service coupons in lieu of any other gratuitous service and it is understood that this is given by WALTER G. DUKE in addition to the guaranty given by the Manufacturers of the tractor and does not in any way change or modify said guaranty.

ACCEPTED

By Owner
WALTER G. DUKE.

Above are the front and back covers respectively of the Duke service book. One of the coupons appears at the right

No. W. G. DUKE

11

SERVICE COUPON
Good for One Half Hour's Labor
Not Good If Detached

isting concerns which include the word "Duplex" in their corporate names.

It is planned to manufacture from sixty to seventy-five trucks for delivery by Jan. 1. The first five cars of the initial commercial output will be ready during the coming week and most of them will go to purchasers in and around Oshkosh. A sales organization is now being perfected and the company plans to undertake an extensive advertising campaign.

S & K BUYS INTERNATIONAL LENS

Newark, N. J., Sept. 14—Edward S. Schmidt and J. H. Knox, trading as the S & K Specialty Co., have purchased the manufacturing and selling rights for the International lens, which is an anti-glare device for headlamps. It consists of a galvanized iron wire mesh covered with a semi-transparent coating which is non-breakable, waterproof and fireproof. The lenses are fitted inside the ordinary plain glass and sell for 75 cents a pair in any size.

TRUCK SALES DIRECTORS UNITE

Milwaukee, Wis., Sept. 16—A national association of sales directors of American motor truck manufacturers probably will be founded this week at a meeting in Detroit, as the result of a conference attended by representatives of ten of the largest commercial vehicle factories of the country in Milwaukee last week. The Milwaukee con-

ference was called upon the initiative of William H. Reese, advertising and sales manager of the Sterling Motor Truck Co., which entertained the representatives for two days. A temporary organization was formed, and each delegate was appointed a committee of one to solicit the attendance of one other sales manager for the Detroit meeting this week.

The purpose of the organization is to plan ahead for the time when not so much of the capacity of truck factories is required for Government work and the industry is better able to produce vehicles for ordinary commercial channels in sufficient quantities to meet the demand. Another aim is to insure a proper distribution of the trucks now available for commercial purposes to the end that each truck sold may be placed where it will do the most good in helping to win the war

TRACTOR MAKERS AT CAPITAL

Washington, Sept. 17—Special telegram—The independent tractor makers and the war service committee of the agricultural implement industry held a preliminary meeting with the War Industries Board today regarding further curtailment of farm implements and possible curtailment of farm tractors. No decisions were arrived at.

Gasless, "Go-less" Sunday

Viewed by a Tourist Who Was Caught Out

TWO ideas, publicly expressed, when we contemplated our summer vacation trip, shaped the manner of our transportation: "Spare the railways," and "there is enough gasoline." Result, we pointed the nose of our faithful gas steed westward. Work time approached as August waned. Pushing over the prairies eastward we chanced upon an out-of-town edition of our home paper. It stated that the Government requested a let-up of pleasure travel by motor on Sundays east of the Mississippi river. The first of these sacrificial days was almost upon us and we were caught out, hundreds of miles from home. Could we "step on her" and push the car under the wire before that day of fuel famine?

Rain Delayed Travel

Thursday night treated us to a rain, a fate which makes a motorist trying to hurry over earth roads say—or think—unprintable gems. Followed, Friday afternoon, a heavier downpour. Saturday morning left the Mississippi river in our wake. Five hours in the mud, aided by chains, put us ahead only about 15 m.p.h. At Avon, in the afternoon, we removed the chains, 73 miles on our day's meter, and exchanged slippery earth for choppy, freshly dried mud. Working steadily north and eastward we made Galesburg, Ill., by the middle of the afternoon. To give variety to our harassment we here discovered a two-pronged staple driven deeply into our left rear tire. With but one spare tire we dared not chance further travel without having the double puncture mended. It proved lucky that we attended to the matter, since the hard-worn spare gave up the ghost with one sharp, expiring report the following morning. Darkness found us 174 miles to the good for the day's run but 116 miles from home.

A family council threshed out the proposition, for we knew of no one in authority to render an interpretation for us. Mon-

day should be for us a day of renewed labor, not the holiday it would be to many. Our understanding was that the observance of the request was to rest with the individual judgment and conscience and that exceptions were allowed for persons having no other means of transportation. We were in sympathy with the idea of saving gasoline, but we felt that, as its use was allowed six days a week, to lay up for a day would not save a pint of gas, since the same fuel would be used had we been able to finish by Saturday or should we be held until Monday for the journey's completion. The ride, we argued, was to us no longer a joyful experience but a business trip to return us to waiting duty.

Why not finish by train on Sunday? For several assorted reasons. We had made a budget of our vacation expenses and had estimated so accurately that our purse was flat. We had enough of Saturday's gasoline in the tank to finish the journey but not enough coin to pay our several train fares and hire a chauffeur to drive the car in on Monday. Nor, in these days of short-handed garages, is it easy to pick up a man for this purpose. So we pushed on.

What attitude would other individual motorists have taken when left to a voluntary classification of pleasure and necessary motor travel upon that day? Church-goers from farms were to have some sort of special consideration, we had heard. A pencil and paper permitted making a record for the day. The route was the Cannon Ball from between Dover and LaMoille to Chicago. The hours were 9 a. m. to 3:20 p. m. That sounds like poor progress for 116 miles, but we were interrupted by that blow-out and by a halt for lunch, while the last 20 miles were covered under the conditions of city traffic in Chicago and suburbs.

This memo shows seven cars in motion before 9 a. m. From 9 to 11, when people

bound for church might be using the highways, we passed upon the open road between towns ten buggies, seventeen passenger cars and two huge gray trucks, one drawing a trailer and both marked, "In transit, national service." We also saw three cars parked in front of a rural church.

In the same two hours, 9 to 11 a. m., we made a separate count of all the vehicles in sight within the towns, either in motion or parked before residences, stores or railway stations. Presumably a car standing upon a street had been used earlier in the day or was ready for operation at a later hour, otherwise it would be put away out of sight in its garage. Whenever cars in a town were parked before a church they are so mentioned. LaMoille had two cars in its street at the time of our passage; Mendota, much larger, fifteen; Earlville, two cars and one buggy, in addition to twelve cars and two buggies at a church; while in Le-land but two buggies were visible.

From 11 o'clock until noon, we figured, church-goers would be halted at their places of worship, so travel within this hour was presumably non-religious. Between towns, for this hour, we saw but two local cars, together with six buggies, one motorcycle, a motor truck load of household goods, a truck of machinery and three long-distance tourists. All three of these "foreign" cars were bound southwestward and bore the license plates of Indiana, Nebraska and Minnesota. We infer that the first was on the first lap of its journey and the other two parties headed homeward, like ourselves.

During Church Time

During this same church meeting hour the visible vehicles upon town streets were: Somonauk, eight cars, seven buggies, in addition to twelve motors at a church; Sandwich, eleven cars and five buggies; and Plano, six cars, four buggies. At the edge of Sandwich the first objection raised to our being upon the road was by a small boy who shouted, "Oh, you're not patriotic!"

From noon until 1 p. m., when good people might be riding home from service, we listed six cars of local origin, four buggies, an Illinois tourist with suitcases and a Lincoln, Neb., car headed for home. Within towns, for these 60 min., we saw three cars at Bristol; two buggies at Montgomery; thirty cars, twelve buggies, one motorcycle, one laundry delivery car and one motor hearse at Aurora, one of the largest cities on the route; and four cars and two buggies in Naperville.

Up to this time, though the traffic was far below normal on a pleasant Sunday, we had had enough company not to feel lonesome or vividly conspicuous. The country passed through had been real farms and nearly all small towns. From Naperville onward the character changed and became urban, consisting of suburban dwellings of city people interspersed with small truck farms, the shortly separated villages soon becoming a continuous population through the more immediate suburbs



On gasless Sundays in Chicago the family nag comes into his own and the baby go-cart has the right of way on the boulevards

which led the way into Chicago proper.

The atmosphere of the road likewise changed. No, a thermometer would not register it, but a psychological meter would suggest an iceberg in the offing. We thought some organized agency must have been definitely rousing and co-ordinating patriotic sentiment. We wished we could melt away into grease spots or discover some underground passage or wings for our motor. Miles upon miles of a dense population were to gaze upon us.

Hostility was in the air. The ancients, with their oyster shells, knew long ago the effect that public ostracism can have in keeping people upon the straight and narrow way. The modern version shows the power of unanimous public sentiment in keeping persons off of their accustomed way. Through all this series of suburbs we saw but four cars, two motor trucks, six buggies and two wagons abroad between the municipalities.

Within these cities such desolate streets have not been since pavements and motor vehicles first appeared there. For blocks not a vehicle would rumble save clanging street cars. At York we spied two cars. If Maywood had a car not discreetly under cover we did not meet it. Oak Park had visible three cars and a truck. After entering Chicago we witnessed only fourteen cars and three trucks, together with several electrics. During our abased progress blue-coats drew out notebooks, but in silence; pedestrians on street corners halted and glared with glances warranted to penetrate their object and come out intact on the other side; brave boys called out epithets they believed justified; no one asked an explanation.

Census Last Year

In contrast with streets and roads swept almost bare to meet a patriotic request, not a command, consider this census taken a year earlier on the Sunday before Labor Day, on the same Cannon Ball trail but farther down the line. This 1917 Sunday checking was between Bushnell, Ill., and Princeton, Ill., for 7 hr. of mid-day. The mileage was almost the same as that of the corresponding Sunday of 1918. The numbers cover all of the open roads between



Chicago's Michigan boulevard, looking north from the Blackstone, deserted and bare on a gasless Sunday



How Milwaukee protects its doctors from charges of "slacker"

towns while our own car was in motion. The summary was 166 local cars, three camp cars, eleven tourist cars without camp equipment, twenty-eight horse vehicles, four motorcycles and eleven boy-cycles.

Further contrast may be afforded by a count made upon an earlier Sunday of the present summer in the eastern half of Kansas, between Hiawatha and Smith Center, about 210 miles, most of it good road save for 30 miles of mud. This was upon the Pike's Peak Ocean-to-Ocean Highway, which accounts for seeing ten camp cars and eighteen motors of long-distance tourists not camping. Local traffic for this day

comprised 103 cars, one truck, three wagons, five buggies and two motorcycles.

The figures set down show by no means the total traffic upon these roads for the stated hours, but only such as was passed by a moving car, yet such fragments of the moving procession suggest the great magnitude of normal Sunday travel and the great saving to be effected when we put a ban upon their use for that day.

Learning the Comfort

In the period of gas famine what are people doing? They are certainly learning a renewed appreciation of the comfort and convenience of a car. Most farmers appear to have disposed of their old family carryalls and to have retained only a one-seater, one-horse buggy. Two adults and some very small children can thus attend church and the rest of the family remain at home. In small towns the motor-owners are walking to church or to make calls in the neighborhood, and that is the limit of their journeying, since few towns owners of cars have a horse vehicle in reserve. In the large cities the street cars and suburban trains are jammed until those standing have scarcely air to breathe. Being out of the habit of walking much many are staying at home and getting acquainted with each other.

CADILLAC TRAINS MECHANICS

Boston, Mass., Sept. 13—Albion L. Danforth, head of the Cadillac forces in eastern New England, put into operation a plan for meeting the shortage of skilled labor that has been a big success. Working in conjunction with A. P. Welburn, manager of his service department, an educational department for training mechanics was opened some weeks ago, with very good success. One corner of the service department was set aside, and out of the mechanical force was chosen a man who could teach as well as work. A list of necessary tools was made up, and cost prices were placed upon them for the students enrolled. The young men are selected carefully so that "rovers" and "lazybones" will not get in and disorganize the department. On entering a student signs the following agreement:

"It is understood that if my service is satisfactory, I am to receive \$14 weekly for the first six months, \$17 weekly for the

next three months thereafter, \$18 weekly for the next three months thereafter, \$20 weekly at the end of the first year, and after that period whatever my services are worth to the company. If I am still with the company at the end of the first year, I shall receive a bonus of \$26, and if I am still with the company at the end of the second year I shall receive an additional bonus of \$26. If at any time I leave or am discharged I forfeit the bonus. It is also understood that I shall pay approximately \$5.50 for tools."

Regular stock cars taken in trade for new Cadillacs are used in the educational department. The work upon them is charged at regular time at actual costs. Some of the students, who had previous experience with cars, proved apt pupils and they graduated quickly into the main repair department. Experiments are being made with special tools, and these will be added to the equipment of the department from time to time.

GIRLS IN CADILLAC SERVICE

Boston, Mass., Sept. 13—Young women have been added to the mechanical department of the Cadillac Automobile Co. here by Manager Albion L. Danforth. After giving the matter some thought, having put girls to work in the salesrooms where they proved efficient, he decided to try them in the service department. The first girl was put to work in the stockroom supplying parts to customers. She did the work so well that the vacancy in the service sales department caused by the draft was filled with another young woman. She proved very valuable and fitted into the position nicely, where she determines cash and credit transactions from her credit file at the time a job order is written and keeps a record of all the movements of cars through the various departments of the building, as well as answering numerous telephone calls. The customers seem to like dealing with the young women, who are courteous and intelligent.

Maintenance of Rear Axles

No. IV—Clark Care and Adjustments

THE Clark internal gear axles formerly made under the trade name Celfor are used by the following concerns: Nash Motors Co.; Stewart Motor Corp.; Beck Hawkeye Motor Truck Co.; Hawkeye Motor Truck Co.; Winther Motor Truck Co.; United Motors Co.; Nelson Motor Truck Co.; Triangle Motor Truck Co., and Denby Monroe Truck Co.

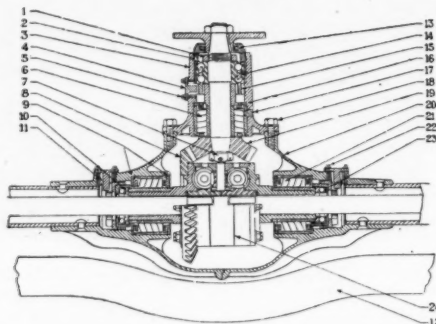
Lubrication

The axle should be lubricated thoroughly when received by the owner. This should be sufficient lubrication for the first month, except two grease cups on the axle on the front side just inside of the brake drum. These should be kept packed with a medium thick grease and should receive a turn every day. All external brake joints should have a few drops of oil once a week.

The large internal gear inside of the brake drum and bolted to the wheel should be lubricated once every week. Access to these is possible through the handhole plates on the dust shield. This must be a heavy grease which will not flow under any conditions of heat. If grease cannot be obtained thick enough, mix graphite with it until it is thick. Put on no more grease than just sufficient to cover the faces of the teeth. More will only leak out and disfigure the wheels.

Fill gearcase a third full of heavy oil or very light grease. Never fill over a third full. This will then need no more lubrication for two months. Before refilling take out the drain cap in the bottom of the case and clean it with kerosene. After this wash out with gasoline to remove kerosene and refill with lubricant.

In cold weather it will be necessary to fill the case with light oil so it will reach the bearings properly. Hub bearings can be given sufficient grease simply by removing the hub caps and filling with lubricant. Do this every two months. Every three



- 1—Pinion shaft outer bearing nut lock ring
- 2—Pinion shaft outer bearing cage
- 3—Pinion flange
- 4—Inner bearing adjusting nut lock
- 5—Inner bearing adjusting nut screw
- 6—Inner bearing rollers and retainers
- 7—Pinion shaft nut, inner and outer
- 8—Differential bearing retaining washer
- 10—Differential thrust bearing assembly
- 11—Differential bearing adjusting nut lock
- 12—Rear axle, center
- 13—Pinion shaft outer bearing cage
- 14—Pinion shaft bearing, outer
- 15—Pinion shaft outer bearing retaining nut
- 16—Pinion shaft inner bearing fiber washer, upper
- 17—Pinion shaft inner bearing lining lock pin
- 18—Pinion flange cap screw
- 19—Pinion
- 20—Rear axle tube
- 21—Differential bearing roller and retainer
- 22—Differential bearing adjusting lock screw
- 23—Differential thrust bearing adjusting nut
- 24—Differential assembly

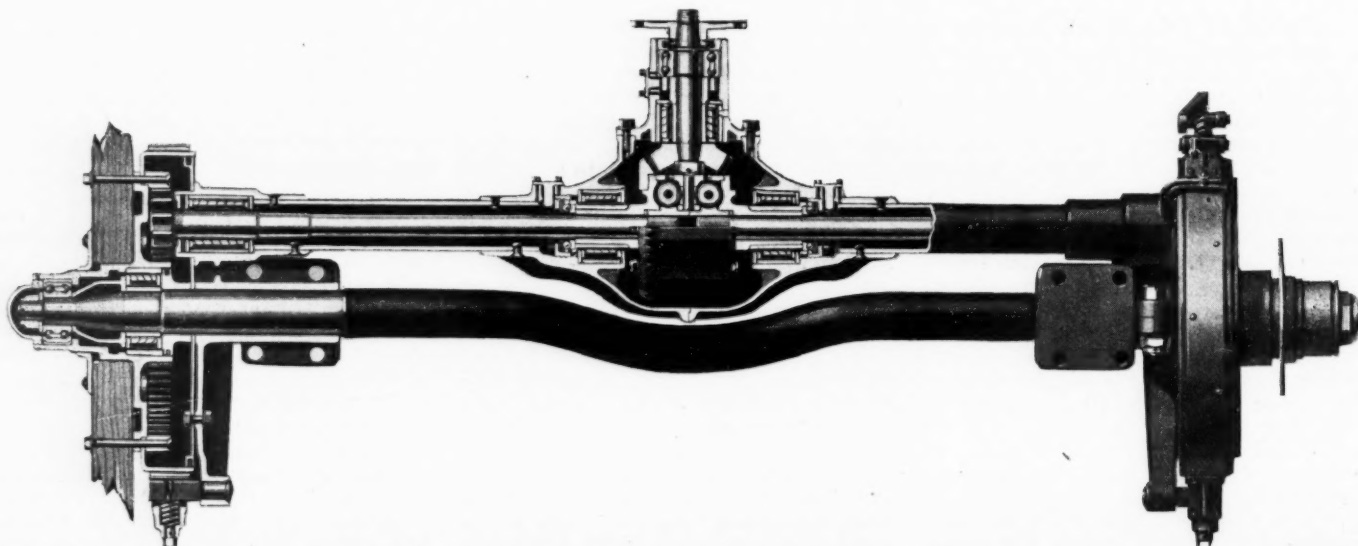
months remove the rear wheels and clean wheel and axleshaft bearings with kerosene and gasoline, applying new lubricant.

Removing Rear Wheel

After jacking up the rear axle, remove hub cap 8, then cotter pin and nut 7. The wheel then can be pulled off from the spindle. The inner bearing is readily removable, the outside lining being a slip in the hub. The brake drum or internal gear then can be removed by taking out the bolts that pass through the spokes.

Removing Differential and Bearings

Remove both wheels and take out the rear axle. Having rear axle removed, remove the drive pinions and axleshafts. It is only necessary to remove the left axle housing. First remove brake band 14 and dust shield 27. Remove the internal brake band adjusting screw 32 and three bolts 28. Next remove the axle housing from the axle bed by taking out the bolts. Separate universal joint next to axle, then remove six cap screws, after which the whole third member and drive pinion can be taken off as a unit. If this unit must be disassembled further to get out the bearings or take off the pinion, proceed as follows: First remove lock pin 17, which is held in place by being peened slightly. When this burr is removed, the pin can be taken out. Next unclamp the split clamp on the under side of the third member casting, then put the wrench on the large hexagon and thread inward on this piece until the threads run out of engagement. Then, by taking hold of the pinion the bearings and propeller shaft can be taken out. To reach 14, unscrew collar 15, which releases cage 13. This can be drawn off over the square of the propeller shaft. Nut 1 is accessible then, and by removing this bearing 14 can be removed from the shaft. After this the Hyatt bearing can be removed from shaft and, lastly, the pinion removed from the



The Clark 1 1/2-ton rear axle, showing it in cross-section at left



Above is reproduced the 1-ton model of Clark rear axle

taper on the shaft. The rest of the process is as follows:

After taking out the third member, the left axle housing can be separated from the right by taking out six $\frac{3}{8}$ -in. bolts. The differential and gearcase then can be removed. To disassemble the gearcase, remove the six long bolts that hold the ring gear. To remove the pinions from the case it will be necessary to remove the taper pins holding the pinions. To remove the drive shaft first remove the wheels, after which, by taking hold of the pinion, this pinion and shaft can be pulled from the axle. To remove bearing 21 simply unthread collar 17, after which the bearing slips out.

Should the live axle bearings need replacement the live axle easily can be taken off from the load-carrying member of the smaller models, up to and including the

3-ton axles, by removing the wheels, taking out driveshaft and unscrewing the four bolts which hold this member to the load-carrying axle at the extreme ends. If it is only necessary to replace the internal gear pinion bearing, this can be taken out without removing the live axle from the load carrying axle, after the wheels and drive shafts have been removed.

Brake Adjustment

The amount of brake action is regulated by a turnbuckle, which screwing on yokes by right and left threads so disposes of the ends of the brake band that the leverage of the brake arm creates the desired pressure on the drum. There are two check nuts which lock the adjustment. To get proper clearance between band and drum turn either to the right or left, adjusting screw in brake band anchor bracket.

at the jobbing house was careless, two shipments of the wrong piece came. Before the right repair had been received the farmer had lost three weeks of valuable time and was madder than a wet hen. Nor was he at all slow about expressing his opinion of the tractor, the dealer and the manufacturer, all to the detriment of that machine in that particular locality.

The disputes and recriminations which broke out between the dealer and the manufacturer over this incident resulted in the transference of the agency to another dealer.

Everybody lost. The prestige of the tractor was damaged in that vicinity. The dealer lost a good customer, as well as the agency for the machine upon which he had spent time and money. The farmer lost time, temper and doubtless a portion of his crop. All because this dealer hesitated about investing a few dollars in a stock of repairs instead of depending upon a distant branch house to help him out in time of need.

Farmers do not buy tractors for fun or to experiment with. They buy them because they expect them to do the work on the farm when it ought to be done.

Up to Dealer

The farmer quoted it right when he says that the farmer uses a tractor for "necessary work," hence it is up to the dealer to be in a position to take instant care of anything that goes wrong.

Service always has been essential in selling tractors, but whereas in the past it has been possible for the manufacturer to carry the principal burden of this, it no longer is possible for him to do so. The obligation has fallen upon the dealer and unless he is willing to assume this obligation his life as a tractor dealer will be short.

The farmer realizes this and as more and more of them buy tractors, they will become increasingly insistent upon the quality of dealer service. Inevitably, their patronage will go to the dealers who give service and just as inevitably the tractor manufacturer will look for dealers who appreciate this fact.

This constitutes the motor car dealer's strongest claim to be considered the logical tractor dealer, because he has been educated up to the importance of service, expects to render it, prepare himself for it in the way of equipment and makes good.

Tractor Must Do Work at Right Time

Up to Dealer to Provide Service

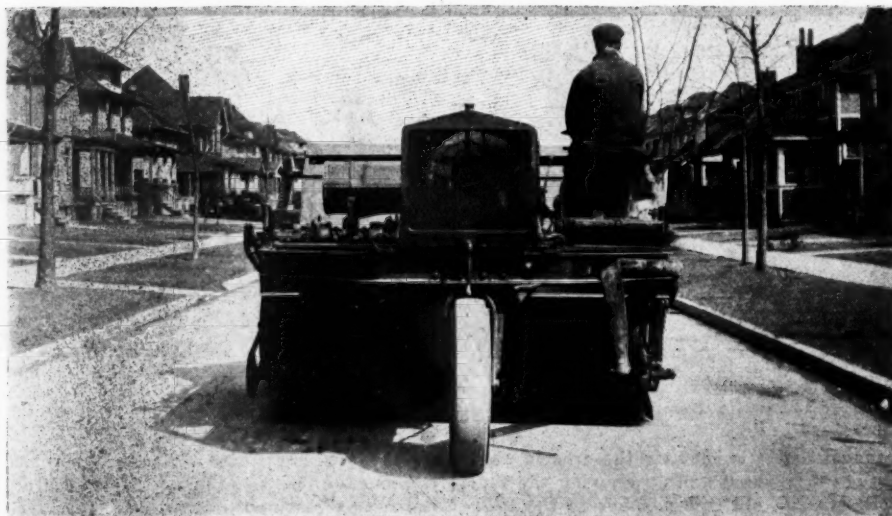
"A TRACTOR is used for necessary work and its value to the farmer lies in its ability to do that work when it ought to be done," says Charles Rohdes, who is using a two-bottom tractor to farm a quarter section near Champaign, Ill. "When a tractor is out of commission, the operator is idle and the work stops. It isn't like having something happen to a horse. A farmer can nearly always change teams and go ahead, but when his tractor balks he is helpless. There is nothing to take its place and it never goes wrong when it's idle, just breaks down when in use and when the farmer needs it most. It means something then for the farmer to be near a dealer who can give him quick service and good service and, above all, one who has a stock of repairs, so that when anything breaks a new piece can be got immediately. If the farmer must wait for the new piece to come from the factory, he may lose all the advantage a tractor otherwise would be to him by having his work held up just when it ought to be done. I think every tractor dealer always should carry a complete line of repairs. If a farmer can't get repairs for his tractor in a hurry when he wants them, he had better stick to his horses and be done with it."

A neighboring farmer, D. W. Rice, also a tractor owner, says that whether the dealer carries repairs or not "is one of the most important things a farmer should consider when he buys a tractor."

These are typical opinions by farmers. With farmers taking this point of view regarding the necessity of the dealer carrying a stock of repairs and being in a position to give prompt service, the duty of the dealer is put squarely up to him. This duty is emphasized, too, by the admission of the manufacturers that with so many machines in the hands of the farmers, as is the case now, it is impossible for the factory or the branch house to give advice and this means that it is right up to the dealer.

A case in point is that of a dealer who recently lost the agency for a tractor upon which he had built up a good trade, because he was not in a position to give repair service. A tractor belonging to one of his customers broke down right in the middle of the plowing season. The dealer had neglected to provide himself with a stock of repairs and the best he could do was to order from the nearest distributing agency of the company. Either because he was careless in ordering, or because some clerk

A White Wing That Runs by Motor



This might be a puzzle as to which way the White Wing is going, judging from the location of the radiator

IT is claimed that this machine can do the work of four horse-drawn vehicles and clean the streets at a cost of 7 cents a 1000 yd., including upkeep. It is three-wheeled and has an 80-gal. water tank under 60-lb. pressure which forces the water out in a fine spray through four nozzles in front of the machine, which wets down the dust so it can be picked up by a revolving brush 8 ft. wide and carried to the large box-like conveyor in front.

The motive power consists of a 40-hp. engine in the rear of the machine. An air pump is connected to the engine and produces the pressure for the water tank. A chain and sprocket drive revolves the brush and conveyor arrangement. Two speeds are provided, forward and reverse, and 10 m.p.h. is attained. The machine cleans the street within 16 in. of the curb, that part being left for the ordinary white wing street gang.

Using the Truck in Orchards and Groves

UNCLE SAM should be all smiles because of a new invention for the car or motor truck that has just made its appearance in the western part of this country, for in it is an unexpected and entirely satisfactory assistant in the harvesting of the future crops, that will do much toward feeding the world. This new device, which makes the work of gasoline-driven vehicles in the sort ground of the orchard or the grain field possible, is a steel flange which fastens to the outer side of the different wheels of the machine. This apparatus enables the car or truck to move over the soft ground just as readily as it does the boulevard, one feature of the contraption being that it does not interfere in the least with the operation of the vehicle on the hard-surfaced roads.

Used in Groves

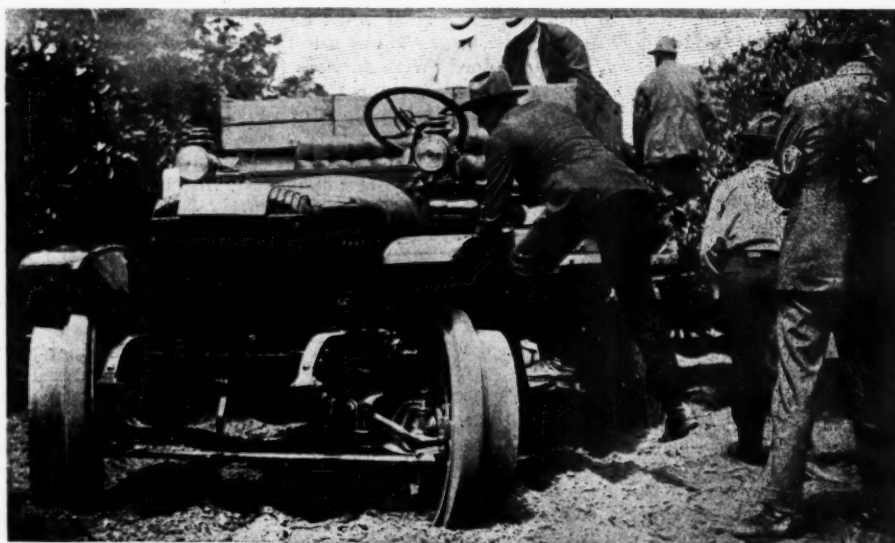
The tractor is used in connection with the various types of orchards and groves. The tractor has demonstrated its ability to take the place of the horse in plowing or cultivating in the grove, but when it came to hauling the product to market it is right there that the average tractor fell down. This necessitated the keeping of horses simply for the hauling of the fruit to the packing houses, or the like. When the use of the truck in the orchard was tried out the difficulty of operating the machine in the soft earth soon presented itself, and the

tends from the fellow of each wheel. This gives the machine the appearance of having been equipped for duty on the railroad rather than the orchard. One of the points about this flange is that when used upon the hard-surfaced street the flange clears the ground by several inches, the truck riding solely on the hard rubber tires. When run from the hard street to the orchard the tires press into the soft earth, until the flanges are engaged, when the machine runs along, on account of the greater bearing surface, just as does a wide-wheeled tractor. Provision also has been made for added traction, which the machine naturally needs when working upon the soft ground. This is obtained by a series of cleats which have been fastened diagonally to the steel flanges fastened to the rear wheels.

Given Try-out

A short time ago this new flange-wheel attachment was given a thorough tryout. With a trailer attached this truck plowed its way over the soft ground of the orchard to the loading point. When this was reached 145 boxes of oranges were piled on the truck and the trailer, and at 60 lb. to the box it will be seen that the gross weight of the load was about 8700 lb., to which was added the weight of three men who rode on the truck. With this load the truck and the trailer wound their way around the trees, turning corners as sharp as is possible with the team of horses and without injuring the trees in the least. The fruit was conveyed from the orchard, past the farm house and up the lane to the asphalt road, thence along this boulevard to the packing house without a stop.

Heretofore the wagons used in hauling this fruit to the packing houses have been ordinary steel-tired vehicles. The trucks invariably ride on rubber and it is claimed that the substituting of the rubber for the steel tire will do much toward maintaining of the fruit in perfect condition for packing and shipping, for it is known that any damaged fruit which happens to escape the trained eye of the packing house employee generally decays before it reaches its destination.



Here is the flange wheel which makes it possible to use a truck on the soft soil of an orchard



Even the Sunday school of this church has its car

A CHURCH car for gathering up certain members! Something new under the sun at last. One church obtains it by an appeal which is, in brief: "You happen to have a car, we notice, and we're sure that patriotic, as well as natural personal motives, make you eager to conserve oil, tires, gasoline. Now, here's a plan we're consid-

Cars to Increase Church Attendance

ering and wish to have you speak on at a meeting of motor-owner members of the church. We're to make a complete census of our car owners, with capacity of their largest cars. With this we will make a record of seats used by the largest number of their households attending church. The extra seats then will be counted, and in addition a geographical directory made of the cars. One Sunday you start for church

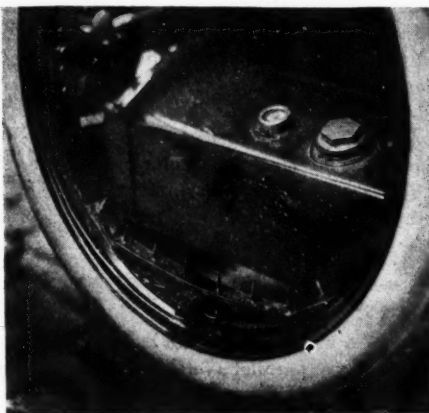
with your car a trifle earlier. You call for Mr. and Mrs. A——, who occupy your rear seats, vacant otherwise. Another Sunday you'll be called for by someone, saving gasoline, tire wear and the like to you and so on."

Spikes on Spares

BECAUSE some boys will persist in stealing rides on the rear of motor cars in spite of warnings to the contrary, this inventive motorist has thought of a new idea which effectually prevents the stealing of rides on the back end of at least one car.

You have often seen these pointed spikes used elsewhere to keep persons from parking on window sills, fences and railings, but it remained for this car owner to apply this preventive to the inside of the spare tire rim on the rear of his car.

Not only does this device prevent boys from hopping onto the rear of his car and stealing a ride, but it also prevents all the accidents which often prove serious to such thoughtless youngsters, not saying a word about the damage to spare tires from having boys break them down by hanging on them while stealing the ride.



What sane boy would hook a ride on these spikes?

When Harvest Time Came They Helped



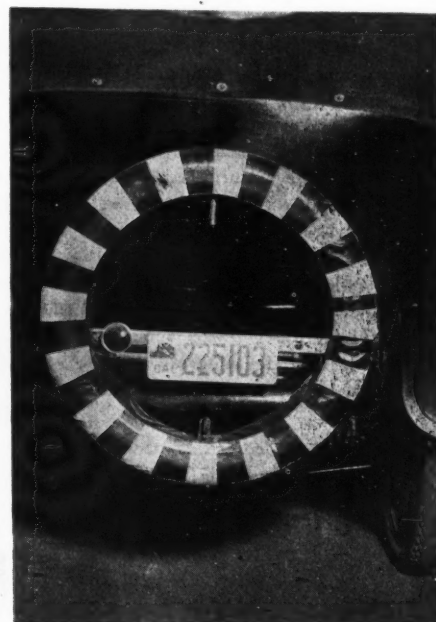
The woman at the wheel thinks a tractor is easier to drive than a motor car

N. J. NELSON, president of the Peoria Creamery Co., Peoria, Ill., found himself short of help when his wheat crop upon his farm east of Peoria was ready to be cut and was bemoaning his ill luck in the hearing of the young women on his clerical force. When all three volunteered to assist in the harvesting their offer was accepted. They were assisted by Mrs. Nelson, and the quartette harvested the crop.

In the center, with two bundles of wheat, is Miss Julia Gorsline, cashier of the creamery company. At the wheel of the Emerson-Brantingham tractor is Miss Ruby Gorsline, assistant cashier. Seated on the binder is Miss Mary Luthy, head bookkeeper, while at the left, piling up the

shocks of the grain, is Mrs. N. J. Nelson. The Misses Gorsline have had some experience in farm work but not so much as Miss Luthy and Mrs. Nelson, both of whom were raised in the country. Miss Ruby Gorsline has been driving a motor car for several years and found the manipulation of a tractor easy, in fact, much easier than her car.

Not only was the wheat upon the Nelson farm shocked so well that the owner had reason to be proud of the job, but it was proved in the threshing, all grading No. 1. The crop was handled by the four women without an accident or mishap of any kind and as well as the most experienced men could have done.

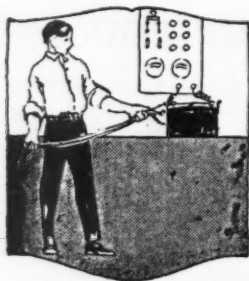


Not a matter of aesthetic taste but of protection

Black and White

TO render the rear end of his car conspicuous so that the man behind would be less liable to drive into it, W. H. Forman, Alhambra, Cal., has fitted his car with a black and white striped casing for his spare tire.

Mr. Forman says that the zebra casing is also a handy identification for locating his machine when it is parked among many others.



Electrical Equipment of the Motor Car

By David Penn-Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the 112th installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York.

A thorough explanation of the fundamentals of electric circuits preceded descriptions of the general types of starting, lighting and ignition apparatus, signalling devices, magnetic transmissions, etc. This is being followed by the installation, care and repair of individual systems, beginning with the special equipment for Fords.

Part CXII—Auto-Lite Systems Continued

THE starting switch most commonly used consists of a metal ring with several extended arms, or leaves, which extend parallel to the axis of the ring. A cylindrical copper sleeve slides on a vertical rod and may be pressed inside the extended arms on the ring by a foot button. The ring forms one terminal of the starting-motor circuit, and the cylindrical copper sleeve forms the other terminal, so that the starting-motor circuit is closed when these two parts of the switch are in electrical contact with each other. As soon as the pressure on the foot pedal is removed the switch immediately is opened by the action of a strong spring.

A second type of starting switch operated directly by applying a pressure on a push button consists of two heavy copper strips set opposite each other with their flat sides parallel. These two strips form the terminals of the starting circuit. A copper bar is mounted on an insulating block which slides on a rod in such a manner that the copper bar connects the two strips when the block is pressed down by the driver's foot button. The copper bar and block upon which it is mounted are returned to the off position, that is, the switch is opened, by a coil spring mounted on the shaft upon which the block is mounted.

Another type is mounted on the starting motor housing and is operated by rods running from a foot pedal or hand lever.

The switch consists of two flat copper contact arms brought into electrical contact with each other by a bar of copper mounted on an insulating block, which in turn is carried on a sliding rod directly beneath and parallel to the copper contact arms. The starting switch is closed by the same operation on the part of the driver that moves the sliding pinion into mesh between the starting motor pinion and the flywheel gear. On some models an additional housing is provided on the starting motor case, and it carries a solenoid and plunger core. The plunger of this solenoid normally drops down into position so that it prevents the closing of the starting motor switch or the meshing of the gears should the driver intentionally or otherwise attempt to start the motor. When, however, the solenoid is energized, the plunger is moved and no longer offers an obstruction to the movement of the rod operating the starting motor switch. A special switch is provided for closing the circuit through the solenoid winding and this switch must be closed when the driver attempts to start the car.

The Ammeter

The ammeter, which is mounted on the dash in plain view of the driver, indicates at all times the amount of current being

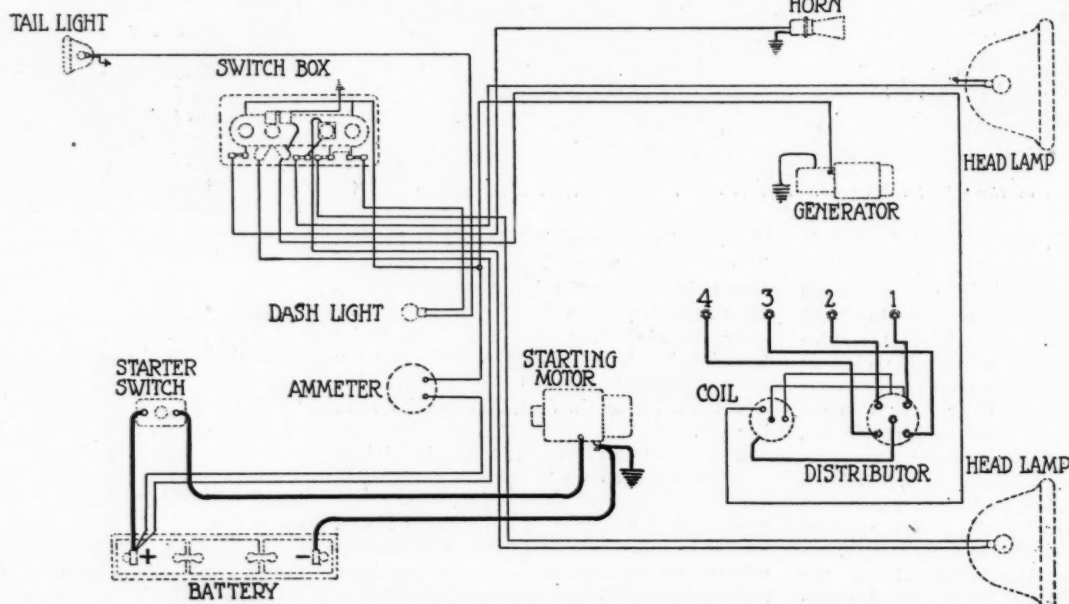


Fig. 601—Wiring diagram of Auto-Lite installation on Overland model 85B

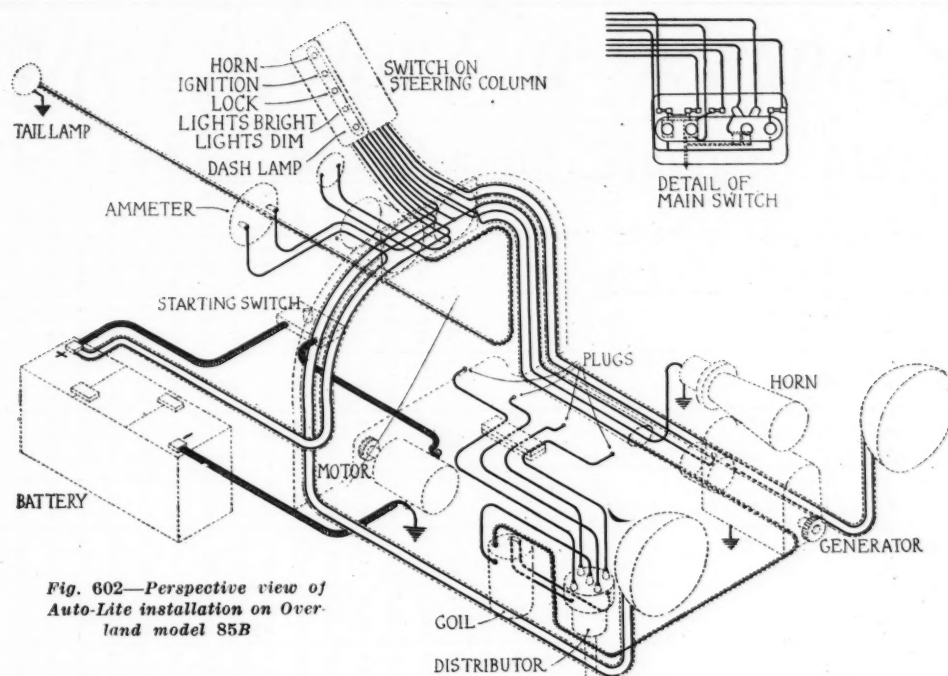


Fig. 602—Perspective view of Auto-Lite installation on Overland model 85B

produced by the generator or discharged from the battery, with the exception of the starting motor and ignition current.

When the indicating needle of the ammeter points to the left of the zero point on the scale, or toward "discharge," it means that the battery is furnishing current to the lights, or discharging it. When the needle is pointed to the right of zero, it means that the generator is delivering current to the battery, or charging it. The amount of charge or discharge at any time in amperes can be read from the scale on the ammeter. The ammeter does not show the amount of energy in ampere-hours in the battery.

Always note the position of the indicating needle when the engine is stopped. With the engine at a standstill and no lights burning, the hand should point at zero. If it does not, one of three conditions exists: Either the ammeter is out of calibration or there is a leakage of current in the wiring or the circuit breaker is not operating.

To determine if the ammeter is correct, disconnect one of the wires of the ammeter. If the indicating needle swings to zero, the trouble is leakage of current, which must be located immediately and corrected. If the ammeter hand does not point to zero with one of the wires disconnected, the instrument is out of calibration. This in no way affects the operation of the system, but, of course, it must be taken into consideration when reading the ammeter.

If the engine backfires when being shut down and makes one or more revolutions in the reverse direction, the ammeter needle may be found pointing to the extreme left side of the scale. This is caused by the circuit breaker points being held closed and means a short-circuit of the battery through the generator. This must be corrected immediately by disconnecting the generator or by separating the circuit breaker points or by cranking the engine.

If the wiring of the car is disconnected for any reason and on being connected again the ammeter shows a discharge with no lights burning, the wiring should be inspected at once, for it is probable that some of the wires at the generator or circuit breaker have been connected wrong. If this is not corrected immediately the battery soon will be discharged.

The ammeter should be wired so as to read "charge" with the indicating needle pointing to the right, when the generator is charging the battery, and "discharge" with the needle pointing to the left, when the current from the battery is being used. If the indication is in the opposite direction it may be corrected

simply by reversing the two wires connected to the terminals of the ammeter.

Ammeter Troubles and Causes

Ammeter burned out:

Excessive discharge due to short-circuit in ammeter to switch wire, wires from switch to lamp and horn or ammeter to circuit breaker wire. If discharge occurred with all switches "off," short is between ammeter and switch or ammeter and circuit breaker.

Ammeter shows discharge, no lights burning, motor stopped:

Circuit breaker points stuck or circuit breaker points set too close.

Ammeter shows charge with motor stopped, lights burning:

Circuit breaker point arm spring weak, partial short-circuit between ammeter and circuit breaker, or ammeter and switch box. Wire connections to the ammeter reversed.

Typical Wiring Diagrams

A diagrammatic wiring diagram of an Auto-Lite installation on a model 85B Overland car is shown in Fig. 601. A perspective view of the complete electrical installation on this particular car is shown in Fig. 602.

The starting-motor circuit may be traced readily by starting with the positive terminal of the battery, through the starting switch, thence to the starting motor through the motor and directly back to the negative terminal of the battery.

One terminal of the generator is grounded, which results in this terminal being connected to the negative terminal of the battery all the time, as the negative terminal of the battery is grounded. The remaining, or positive, terminal of the generator is connected to the wire leading from the ammeter to the switch box when the contacts of the cutout, which is mounted at the generator, are closed. Any current being delivered by the generator in excess of that required to operate any lamps that are turned on and the ignition system will be delivered to the battery and the ammeter will indicate that the battery is being charged. If the generator current is not equal to that required by the lamps, etc., then the battery will be called upon to assist the generator and the ammeter will indicate that the battery is being discharged.

The dash and taillights are in series and controlled by a single switch.

Piston Displacement Chart of Twelve-Cylinder Engines, Any Bore and Stroke

Motor Age Maintenance Data Sheet No. 4

The Motor Car Repair Shop

Recharging and Testing Magneto Magnets

MOST people when their engine misfires at low speeds blame the carbureter when in reality the fault may lie with the magneto, if the engine is fitted with a high-tension magneto. The missing at low speeds may be due to weak magnets, resulting in too small a spark when the engine is running slowly. At low speeds the magneto does not turn very fast either, and unless it is known to be in good condition, there is every reason to believe that it is not producing a hot enough spark to fire the charge in the cylinder.

There are several ways of determining whether or not the magneto is in good shape. In most cases judgment will tell you the condition. Nowadays everyone operating a motor car is familiar with the theory of how a spark is produced in a magneto and know that every time the lines of force passing through the armature from one set of poles of the magnets to the other are cut by the armature as it revolves a spark is produced, so in testing the strength of the magneto turn its armature slowly by hand and feel the resistance when it reaches a certain point. This resistance will feel much the same as though a shaft were binding in a bearing. This is the position at which the lines of force are broken, and the stronger the tendency of the armature to resist rotation at this point the better the conditions of the magnets. Experienced magneto men can tell by this method the exact condition of the magnets. The best way is to make a similar test on a magneto of the same make and one that is known to be in good shape. Then comparisons can be made. Aside from this means, which, of course, entails the removal of the magneto from the engine, the condition of the magneto often can be ascertained by watching the spark it produces at the several plugs, although this is not an absolute criterion, for several reasons, such as plug gaps, etc.

Weak Magnets

If it has been determined positively that the cause of misfiring is due to the magneto magnets being weak, then the thing to do is to remagnetize the magnets, or field pieces, as they are more properly called. A temporary way of overcoming this trouble is to set the spark plug points a little closer so the weaker spark can jump the gap. However, this does not get at the seat of the trouble and a weak spark is hardly much better than no spark, but it may suffice at times to get the engine hitting on all cylinders for a time. In doing this be sure to set all the plug gaps the same, otherwise the spark is not apt to jump the shorter distances, and let the plugs whose points are farther apart alone entirely. In other words, give each plug an even chance.

To remagnetize a weak magnet it is necessary to bring it into a strong magnetic field for a short time. The actual operation of charging is simple indeed, but

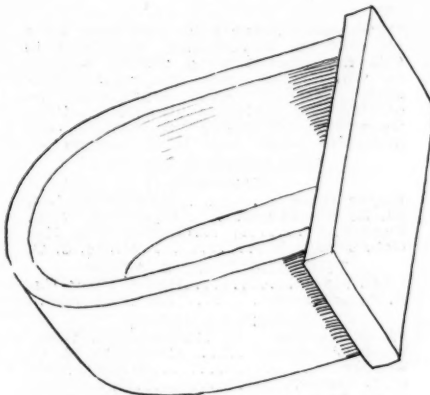


Fig. 1—A magnet should be bridged like this whenever removed from the magneto to retain the magnetism

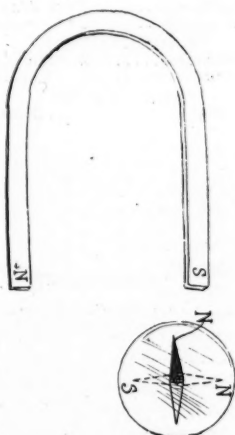


Fig. 2—How to determine the polarity of magnet. One pole will attract opposite pole of compass needle

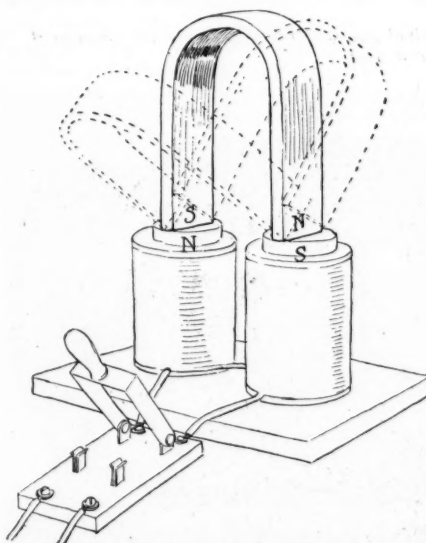


Fig. 3—Charging magnet by rocking back and forth on electromagnet

there are several important things to bear in mind while doing the job. The most common way of remagnetizing the pole-pieces is to use a rather large electromagnet. Nearly every shop where such work is done has some such apparatus, or if need be one can be made easily. However, let us assume that we have access to an electromagnet of the four-pole type whose coils are about 4 to 5 in. in diameter and about 7 or 8 in. high.

Briefly, an electromagnet consists of a base supporting two cores around which are wound many turns of insulated copper wire. The spools are wound in opposite directions and the inner ends of the wire connected, while the outer leads go to a switch, as shown in Fig. 3. The wire generally used for such electromagnets is No. 20 B & S gage.

Remove the magnets from the magneto and place a bridge of steel across the ends of the U-shaped piece, as in Fig. 1, so as to retain the magnetism it still possesses. Usually there is some designation to tell which is the north and which is the south pole, such as is indicated by the V painted on the south pole of a well-known magneto. But if there is nothing by which to determine the north and south poles, take a small pocket compass and hold it close to one of the poles of the magnet. As the north pole of the magnet will attract the south pole of the compass needle, or vice-versa, it is easy to tell magnet polarity.

Having done this you are ready for the remagnetizing. With a 110-volt direct current of about 5 amp. passing through the electro-magnet windings, the procedure is, first, to place the magnet on end on the poles of the coils, as shown in Fig. 3, being very careful to put the north pole of the magnet on the south pole of the electro-magnetic coil and also remembering that the poles must not be changed in their relation to one another once the operation has begun. While this magnet is on the coil, the current should be switched on and off very rapidly at intervals.

Care of Magnet

Care must be taken that the magnet be not over-saturated, for in this state they are useless. Ordinarily the time required to remagnetize fully a U-shaped magnet such as the average magneto possesses is about 1 min. The best plan is to leave the magnet in place on the coil for about ½ min. and take it off. When in good shape the magnet should be able to lift a piece of steel weighing from 12 to 14 lb. If on testing it after charging it fails to do this, it must be magnetized further. On large magnetos the lifting power should be more than these figures. If still weak, put the magnet back on the coils and rock back and forth, being sure that the same poles are in contact as before. Then turn the magnet on its side for a few seconds, these various positions being indicated by the dotted lines in Fig. 3.

The Readers' Clearing House

Conducted by B. M. Ikert

Operation and Construction of the Bendix Drive

A PIECE of apparatus that plays an important part and yet is probably forgotten by the average motorist is the Bendix drive which couples the starting motor with the flywheel of his engine and performs the operation of cranking when depressing the starter switch. Ordinarily the Bendix drive requires no attention during the life of a car. The screwshaft never should be oiled or lubricated. It is not necessary and, in fact, the makers state the gear works better when the screwshaft is dry.

Through accident or otherwise should the flywheel ever be entirely exposed and unprotected and the flywheel gear possibly drag in wet mud, a slight inconvenience might result. But this is hardly likely to ever occur. The gear on the screwshaft has a self-cleaning action, but in any extreme case, should the gear tend to stick on the shaft, it may then be necessary to clean the screw.

Backfires are unnecessary, because the driver should see to it that his spark lever

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, MOTOR AGE segregates inquiries into divisions of allied nature. Questions pertaining to engines are answered under that head, and so on.

THE BENDIX DRIVE ENGINES

Edgar Nace.....Monticello, Ind.
W. B. Wheatley.....Charlotte, N. C.
Reader.....Madisonville, Ky.
Delmar Gooch.....White, S. D.

THE ELECTRIC SYSTEM

L. G. Hagel.....Rigley Park Pa.
F. A. Schleuder.....Austin, Minn.

MISCELLANEOUS

W. G. Hartley.....Chattanooga, Tenn.
W. B. Wheatley.....Charlotte, N. C.
Reader.....Rippey, Iowa
M. C. Oster.....Roy, Mont.
C. W. Gish.....Holesville, Neb.
J. L. Nugent.....Dietz, Wyo.
C. G. Arnold.....Memphis, Tenn.
C. H. Bowman.....Nash, Okla.
L. Grant, Jr.....Albuquerque, N. M.
E. Huber.....Los Angeles, Cal.
Delmar V. Morehart.....Sannemlin, Ill.
W. F. Schumann.....Chicago
G. S. Gunderson.....Fort Wayne, Ind.
Mac L. Nichols.....Los Angeles, Cal.

CARBURETION

Fred Schumann.....Manchester, Iowa
W. F. Schumann.....Chicago

REBUILDING

John F. Fisher.....Biloxi, Miss.

is retarded properly and the throttle should not be wide open, just enough for starting. In case of a backfire the explosive shock in the Bendix drive is taken through the coil spring, which absorbs most of the destructive blow. As an extra precaution against backfires the drive spring and drive screws are designed with large factors of safety.

The teeth on the screw gear and flywheel are chamfered on one side to make the meshing easy and natural. However, should the teeth meet end to end, the screwshaft itself is designed to automatically move backward against and compress the coil spring. This gives the screw gear time to turn and enter the flywheel gear. Should sticking of gears ever occur, they can be released by throwing in the clutch and moving the car. Such trouble would be due to incorrect chamfering or inaccurate alignment of gears. Also it might be due to the binding of the drive parts and prevent compressing and proper functioning. Such defects should be corrected.

If while the engine is running the starting motor should be started accidentally, the screw gear, of course, will screw over against the turning flywheel gear. But instead of the clashing and smashing of gears that might be expected there is no damage whatever, as the gears simply touch once. This is because the flywheel gear will speed up the screw gear and thus automatically screw it away. The turning screw gear then will clutch automatically and bind on the screwshaft, in exactly the same manner as when it is cranking and has been demeshed when the engine starts exploding.

Engines

His Engine Overheats

Q—Can you give me the reason for excess heating of 1916 Monroe roadster? In ½ mile running the water will boil over. The water circulation is good, plenty of cylinder oil, cylinder walls are not scored, valves have been ground, no carbon in engine, crankcase has been cleaned out and new oil put in. The engine fires on all four cylinders. The car comes from the factory with a two-blade fan and I put on a six-blade, but it did not have any effect on the cooling. I have a Zenith carburetor with an 80 and 85 jet. I have tried different mixtures on the carburetor, but that has no effect on the cooling. Would you advise a different make of carburetor? Could play in the timing gear at the end of the distributor shaft cause the heating of the engine?—Edgar Nace, Monticello, Ind.

There is always some good cause for an engine that persists in overheating, when everything apparently is all right. As long as you ask about the play in the timing gears, it is possible that there is too much wear in these, and consequently the engine fires too late. This would cause overheating. Also examine your spark rod and make sure none of the parts have shifted. Sometimes the rod operating the distributor or the connection to the steering post bell arm slips out of position and thus the timing is thrown off. If your mixture is correct the engine should increase in speed when the spark is advanced.

Be sure your carburetor is running as

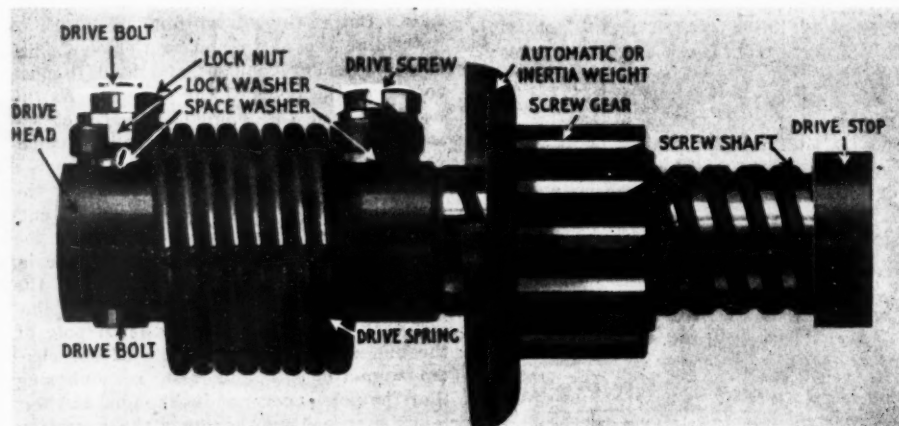


Fig. 1—Bendix drive with names indicating principal parts. This also shows the chamfered edges of the screw gear

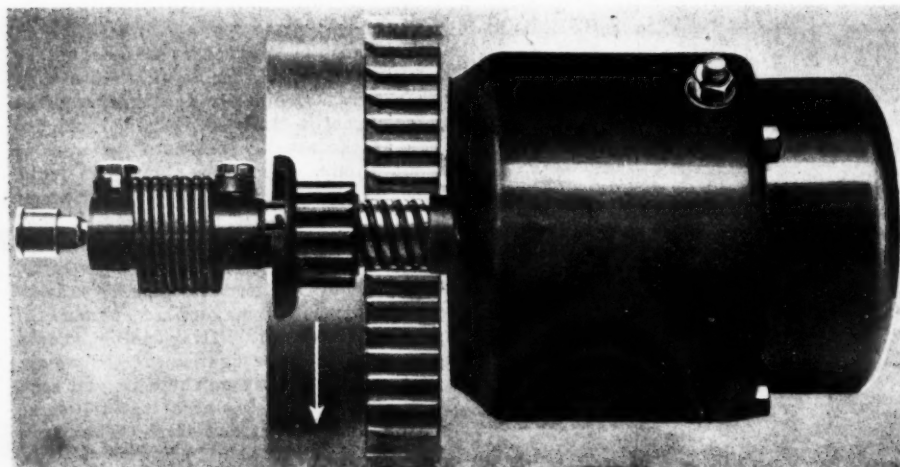


Fig. 2—Bendix drive, showing its application to starting motor and flywheel of engine. The arrow indicates the direction of flywheel travel

lean as possible, and check up on the float level. Too high a level would cause overheating. The fan you installed may have too many blades and be not so efficient as the two-bladed one.

Overheating is caused in some instances by the casting having imperfections in it which cause steam pockets. These prevent proper circulation and the water boils readily. But if the engine has not always easily overheated this is not likely to be the cause. Make sure your valves open and close at the right time and, finally, see that the gasket is all right, so that it does not leak.

Causes of Engine Knocks

Q—Will a lean carburetor mixture cause a Ford engine to knock?—W. B. Wheatley, Charlotte, N. C.

A weak mixture may cause knocking under certain conditions, for instance, if the bearings are worn. A rich mixture is more apt to cause knocking, however. Generally speaking there are five causes for knocking: Spark too far advanced, pistons and cylinders carboned too much, loose connecting rod bearings, cylinder worn or ring broken, loose main bearing. Too high a compression also will cause knocking.

Engine for Stationary Work

Q—I have a 1911 Mitchell, 4 1/4 in. bore and 5 in. stroke, in good shape that I wish to use for stationary work. At what speed will the engine develop its best power? What power at 800 or 1000 r.p.m.?—Reader, Madisonville, Ky.

It is impossible for us to give you very definite information on this, as we do not know the condition the engine is in for one thing and, secondly, the work you want to do with it. If the engine is in good condition and you have a modern carburetor on it, there is no reason why it should not be all right for stationary work. Its horsepower, N. A. C. C. rating, would be about 28 hp. The only way you could ascertain the horsepower at a given number of revolutions would be to use a dynamometer. At 1000 r.p.m. we should say off hand, the engine would develop about 15 or 20 hp. We suggest that if you want to use this for stationary work you fit a governor, such as suggested in the Readers' Clearing House, issue of Aug. 22, in connection with an old Overland engine.

Injecting Water Vapor

Q—Water or steam vapor injected into the intake manifold of a car is supposed to have a beneficial effect on the running of the engine. Is this true? If this is true, which is the best method to inject, just water spray, or heat it to a steam and then inject?—Delmar Gooch, White, S. D.

Much has been said and done about introducing water into the cylinders of an internal combustion engine and this year Motor Age received many replies from readers regarding their experiences with water vapor injection in response to this question.

Experiences varied. Some stated they were more than pleased with their experiments while others were not favorably inclined toward it. Many stated that carbon trouble was greatly reduced. On one engine the introduction of water vapor stopped exhaust valve warping by injecting just enough vapor to overcome the intense dry heat that caused the trouble. Many readers said that water vapor was not so desirable on modern engines because the

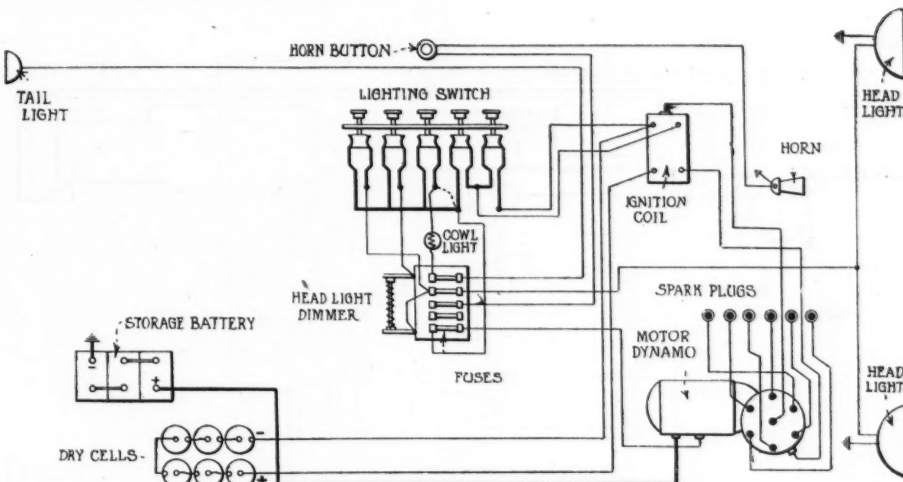


Fig. 3—Wiring diagram of the Delco system on the 1915 Hudson

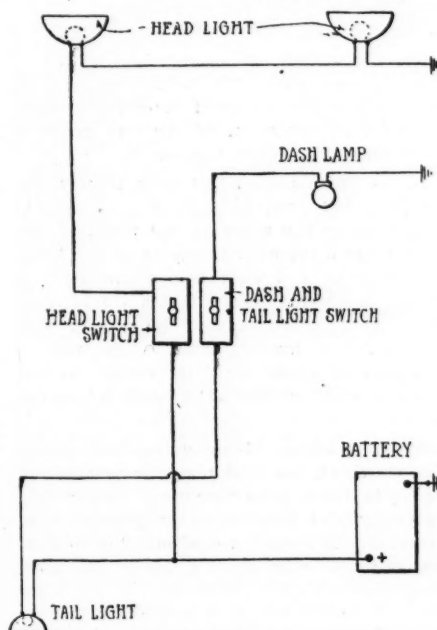


Fig. 4—Wiring of lights on Saxon roadster

manifolding, etc., is much better than on the older cars.

The most desirable way to introduce the moisture is in the form of a vapor, but cases have come to our notice where water was directly introduced with apparently good results. Much depends on the engine design and age, carburetor, manifolds, etc., and it is therefore hard to give information that will be of universal benefit. There are numerous concerns making devices of this kind to whom you might write. These are listed in the advertising columns of Motor Age.

The Electric System

Electric Lights on Saxon

Q—I have a Saxon roadster which I would like to equip with electric lights. I have a 6-volt storage battery and want two headlights, a dashlight and taillight. Is it best to make the connection so both dash- and taillight are lighted at the same time? Show wiring diagram of this.—L. G. Hagel, Rigley Park, Pa.

A method for wiring up this car is shown in Fig. 4. Two switches are fitted, one for the headlights and the other for the dash- and taillights. Thus either the headlights can be used alone or the other two. One terminal of the battery is grounded

to the frame and by grounding one end of the headlight circuit and dash-taillight circuit, the circuits are completed. As shown, the dash- and taillight are connected in series, so that if one does not burn the other also will not burn. In this case use a 3-volt bulb in both tail- and dashlights. Thus when burning they together will equal 6 volts, the same as your battery.

Wiring of Hudson Models

These diagrams are shown in Figs. 3 and 5.

Q—Give wiring diagrams for a Hudson six, model 54, 1914, and same model, 1915.—F. A. Schleuder, Austin, Minn.

These diagrams are shown in Fig. 2 and 5.

Miscellaneous

Parts for Little Runabout

Q—Where can I secure replacement parts for a Little runabout.—W. G. Hartley, Chattanooga, Tenn.

Write to the Puritan Machine Co., Detroit, and Auto Gear & Parts Co., Chicago, for parts.

Wants Book Information

Q—Who publishes The Model T Ford Car by Victor Page and what is the cost?—W. B. Wheatley, Charlotte, N. C.

This book is published by the Norman B. Henley Co., New York, and the price is \$1.

No Twenty-Four Cylinder Car

Q—Did the Packard company ever build a twenty-four-cylinder car? Would this be practical?—Reader, Rippey, Iowa.

We have no record of such a car and doubt very much the practicability of an engine with twenty-four cylinders. Some engineers say four are enough, others say six, while still others advocate eights and twelves.

Mixture May Be Too Rich

Q—I have a Columbia sport model which I have run nearly 1000 miles. Since the hot weather I have had a lot of trouble with the engine heating. Is this on account of the carburetor or ignition? The car is equipped with Atwater Kent ignition and Stromberg carburetor. The car seems to run smoothly except on heavy pulls when the engine knocks and I have to retard the spark way back.—M. C. Oster, Roy, Montana.

Perhaps you have failed to clean out your radiator properly after using an anti-freeze solution. Also your mixture may be too rich. Try cutting down on the gasoline. Many owners run their cars with the same gasoline setting the year round. In summer less gasoline is necessary than in cold-

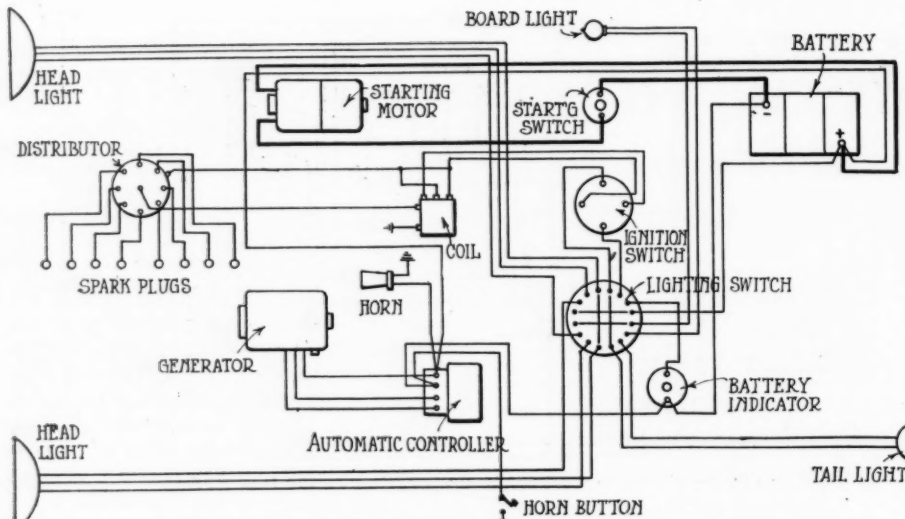


Fig. 5—Layout of the wiring system on the Hudson 6-54

er weather. The ignition could cause overheating if you drive with the spark retarded too far. Always drive with the spark advanced as far as possible. With the system you have the engine is sensitive to the spark position, consequently you have to watch the spark lever more than you do with a magneto.

Medium-Sized Garage

Q—Publish plans for a medium-sized garage.
—C. W. Gish, Holmesville, Neb.

We presume you want plans for a public garage of medium size. Such a plan is shown in Fig. 8. The building measures 50 by 100 ft. In the front is a display room large enough to show two or three cars, with display windows for accessories on the front and side. Behind the display room is an office, with space for a parts department. The repair is at the rear, where it should be for a one-story structure, and here is placed the air pump which is piped to the free air line in front. Do not make the mistake of placing a noisy air pump against the office or in front of the garage merely to save pipe. Customers do not care to yell when talking business.

Gearset on Cadillac

Q—In the transmission of the model 57 Cadillac the countershaft roller bearings are lubricated by the grease in the transmission being forced to them through a tube which revolves with the countershaft. A mechanic recently put ground cork in this transmission to silence the gears which had become very noisy through wear. Would this be likely to clog up this tube, preventing proper lubrication of these bearings? Show a drawing of this transmission and give the proper method for removing top cover plate and gearshifting and brake levers. Also how to replace old gears with new ones? In doing this are the adjustments very difficult?—J. L. Nugent, Diley, Wyo.

It is very likely that the ground cork clogged this oil tube and prevented lubrication of the bearings. Certainly this substance would do no good in a case like this. If you have to overhaul the gearset there are several things to bear in mind.

The teeth of the gears should mesh so the sides of the two gears in mesh will be flush, or at least not to exceed $\frac{1}{16}$ in. of being flush. If it becomes necessary to alter the position of the gears to make them mesh properly proceed as follows:

Move the control lever to low-gear position, being careful not to remove it beyond this position. Then loosen the locknut K,

Fig. 7, and turn the adjusting nut L, thereby moving the shaft M endwise, until the sides of the teeth of the two gears in mesh are flush. Then tighten K.

If the transmission has been totally disassembled, the jackshaft N, Fig. 7, should be placed so the sides of the teeth of the gear A are flush with the sides of the teeth of the gear I before the adjustment is made. Adjusting screws G are provided by which the jackshaft may be placed endwise. After making this adjustment a clearance of about 0.010 in. should be left at each end of the shaft and adjusting screw.

When it comes to replacing new gears, etc., we think the best plan for you to follow is to let a good mechanic do the job, especially one familiar with gearset construction. It requires equipment also that the average man is not likely to have around.

Planning Seat Arrangement

Many MOTOR AGE readers constructing their own cars fail to follow a definite plan when it comes to planning leg room or height of the seats from the floor. Also, they often crowd the seat so close to the dash that driving is anything but comfortable. It is for such readers that we have prepared the illustration in Fig. 11, which gives the dimensions that should be followed as far as possible when rebuilding a car. Most of the cars so rebuilt are along speedster lines, hence the seats can be

somewhat lower than in ordinary practice, but if they are too low, riding long distances will be uncomfortable. For good all-round results the dimensions in Fig. 11 will be found suitable.

One thing to look out for is not to make the distance from the back of the seats to the clutch and brake pedals so great that the driver's legs will be perfectly straight when these pedals are used. There are times when the driver wants to stop the car quickly and he cannot do this very well if his legs are straight before maximum pressure is applied to the pedals. Allow 8 or 8½ in. between the top of the seat cushion and lower end of the steering wheel. Sometimes this is made so small that it becomes a real job to get into the driver's seat. If the top of the seat cushion is about 12 in. from the floor, it will be found suitable for nearly all conditions.

Membership in A. A. A.

Q—Who is eligible to membership in the A. A. A.?

2—What are the requirements, etc.?

3—Who is the secretary of the A. A. A.?
—C. H. Bowman, Nash, Okla.

1—Section 1 of Article 3 of the by-laws of this organization will explain this. It reads:

"Any American automobile corporation, association, club, or other body devoted principally to automobiling, any person owning an automobile or other self-propelled vehicle, any person interested in automobiles, shall be eligible to membership in this corporation."

2-3—We suggest that you write to the American Automobile Association, Bankers Trust building, New York, who will furnish you with a copy of the by-laws and other information.

High Pressure with Carbide

Q—By allowing water to drip on to calcium carbide in an inclosed retort very high pressure may be obtained. Why cannot this fact be made use of in filling a storage tank underground for welding, using a Prest-O-Lite tank in the service line to prevent backfiring into the tank? The flow of gas to be regulated by the flow of water into the retort holding the total pressure in the tank and retort to a safe amount. This to take the place of the regulation gasometer type of generator and the power-driven compressor. A wash bottle and safety valve to be used in the line from retort to storage tank. What pressure is safe in such a storage tank?—C. G. Arnold, Memphis, Tenn.

As you state, by admitting water to the calcium carbide in a retort, a very high pressure may be developed. Unquestionably portable storage tanks could be filled from such a retort but we doubt very much

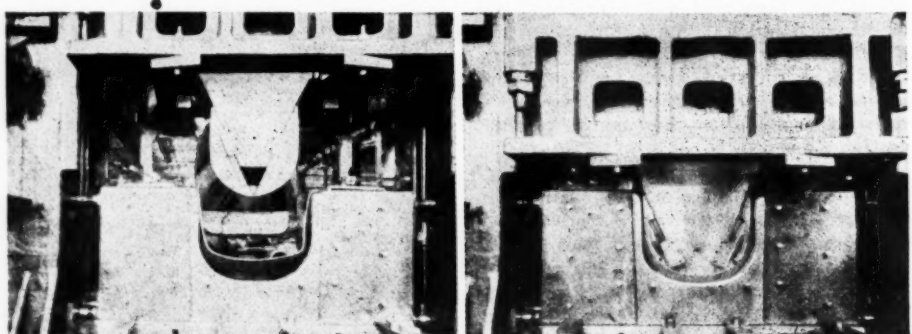


Fig. 6—Expanding punch and die used in Buick factory to form cowl for bodies. Left, metal in place and punch about to descend. Right, punch has descended to bottom of die and expanded to full width

whether the method is preferable to the use of a compressor.

The generation of gas always lags more or less behind the admission of water. The more the greater the proportionate amount of slag there is in the retort, and it is, therefore, very difficult to control the pressure. A safety valve would have to be used, which not only would result in the loss of much gas but would involve serious fire hazards.

The amount of pressure which it is safe to maintain in an underground tank depends entirely on the construction of the tank. Handling calcium carbide in considerable quantities always involves serious risks and calls for the greatest caution. In most localities the storage, etc., of calcium carbide is subject to municipal or state regulations.

Play in Steering Gear

Q—How do you take up play in steering gear of 1915 Saxon four?—L. Grant, Jr., Albuquerque, N. M.

Adjustment of this steering gear is accomplished automatically. Any wear between the gear and pinion is taken up by a bronze plunger held in place by a heavy coil spring. The exterior steering mechanism, including the various points between the reach rod, steering knuckle, cross rod, etc., should be frequently inspected, kept in good condition and properly oiled. Sometimes the replacing of only one or two of the tie rod bolts will suffice to take up play.

Wants Cyclecar Axle

Q—Where can I get a 36-in. tread stationary axle for motorcycle wheels? Where can I get steering gear for front axle?—Delmar V. Morehart, Saunemin, Ill.

So far as we know there is no concern furnishing such axles at the present time, and you probably will have to have them made special or make them yourself. Such axles were quite common a few years ago when the cyclecar came into prominence. The best plan is to purchase a set of hubs having stub axles in them and then braze the stubs into a tube, the latter serving as the axle tube proper. This is shown in Fig. 9. This is a simple construction, provided you can pick up such a set of hubs.

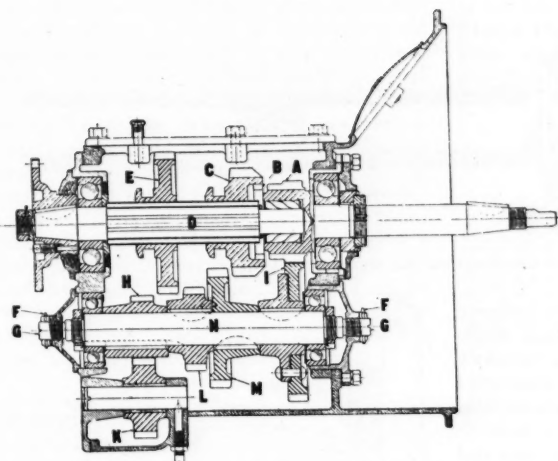
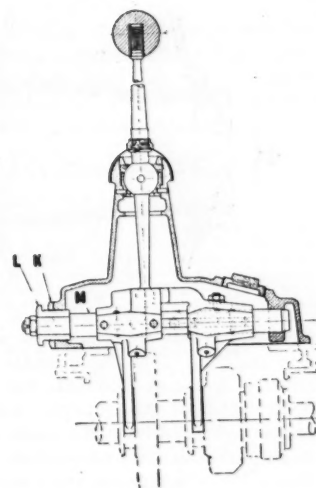


Fig. 7—Sectional view of the Cadillac transmission with principle parts lettered. Right, sectional view of transmission control, showing adjustments



Such hubs formally were made by Harris & Reed, Chicago, and we suggest that you write them, as it may be possible they have a few sets left.

Steering gears for small cars like this are also hard to get nowadays, but we presume if you write to some of the parts concerns advertised in MOTOR AGE, you will be able to locate one. Many cyclecar parts were sold to parts houses two or three years ago, and you should be able to locate a steering gear by writing to some of them.

Tools for Bending Metal

Q—What tools are used in cutting and bending sheets for bodies and what gage of steel is used in first class cars?—E. Huber, Los Angeles, Cal.

The tools and machinery used in factories for making bodies vary with the number of bodies made. For instance, where only a few bodies are made much of the work is done by hand, such as running together the bodies and side pieces of fenders, etc. In some factories this is done by machinery, the workman simply feeding the parts into the machine which seams them together as easily as a seamstress lays a pleat.

Great expanding punches and dies are used to bend the metal to shape after it has been cut by shears to the required size. The cowls in Buick cars, for example, are made with an expanding punch and die, as shown in Fig. 6. It does this in a single operation. The die alone weighs several tons and fills a space of 8 ft. between the main supports of the press. A flat sheet of metal is cut to the shape of the blank and the ends are bent over on the forming table. It then is placed on the die and as the immense cog wheels revolve the blank holder descends, presses the metal partly down in the die and grips the edges firmly so it cannot move. This movement also gives the shroud its preliminary shape at the rear end by an expanding motion of the blank holder. The expanding punch immediately follows, comes into contact with the stock and expands to fill the entire die less the thickness of the sheet metal.

The punch is made in sections, and besides forming the metal to the shape of the die it cuts the door openings and turns the flanges at the same time, as well as punching all necessary holes in the metal.

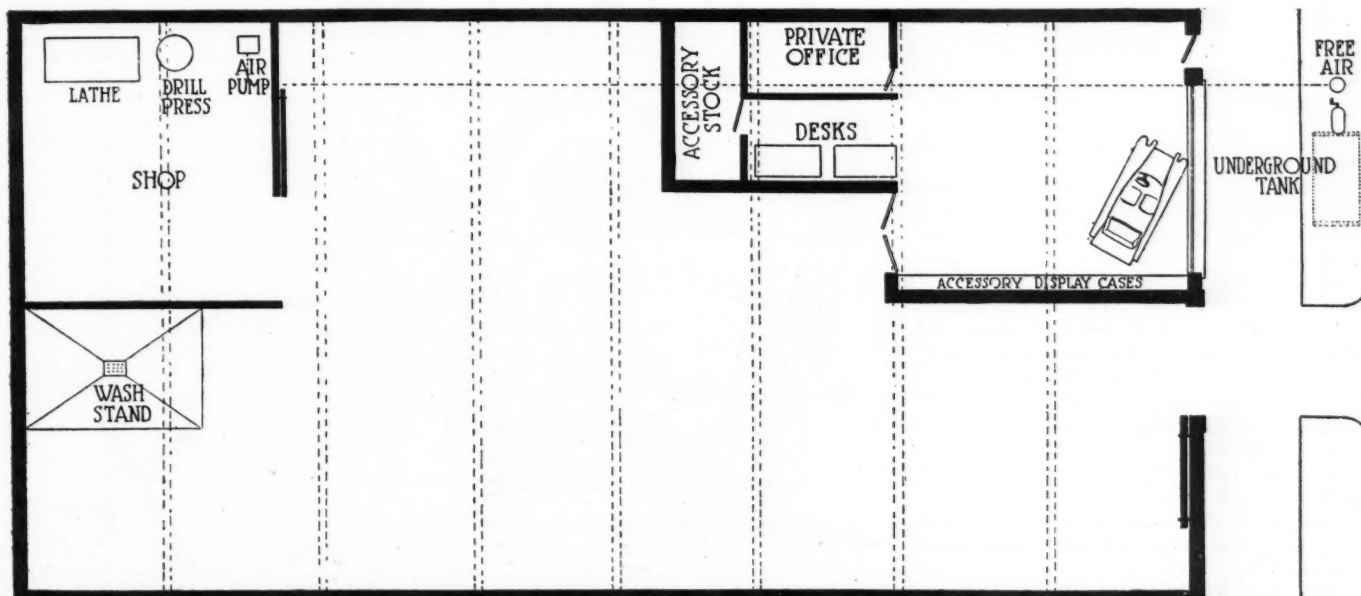


Fig. 8—Ground plan for medium-sized garage to be erected on a lot 50 by 100 ft.

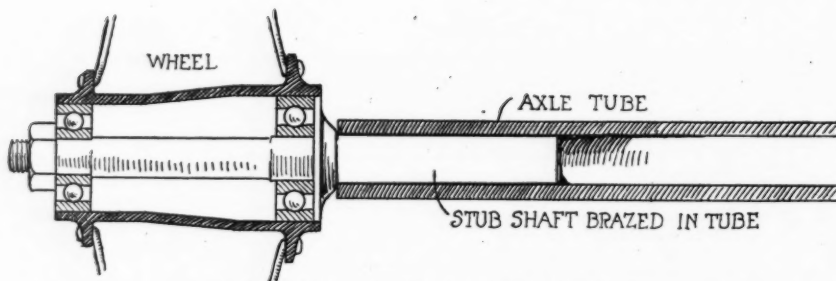


Fig. 9—Axle construction for motorcycle wheels

for body bolts. This machine was designed and built in the Buick shops and, while strictly a Buick product, serves to show how some of the larger manufacturers make their bodies. The same sort of dies with modifications, as needed, are used to stamp the other parts, such as the rear end of the body.

Fenders and such parts are passed through rollers and other apparatus to give them their shape. When these parts are made by hand they have to be hammered over wood forms or blocks of some kind, and it takes a very expert hand to do good work. This sort of work has to be resorted to when a person wants a special body made up for a speedster, etc. It would not pay to make up expensive dies to stamp only one or two bodies, hence the work must be hammered out. Wood mallets and rawhide hammers are used for this and then the work finished with metal hammers and hand anvils to remove the hammer marks. Finally the work is smoothed with emery cloth, and if a good job has been done the work will be the same as though made in a die.

The metal generally used for motor car bodies is 22- or 24-gage. Some use heavier metal than this, about 20-gage.

Leather Preserver and Shackle Bolts

Q—Is there any preparation which will preserve glazed or patent leather upholstery and prevent its cracking and which is more than a mere paint?

2—Assuming that a spring shackle bolt gets proper attention, which makes the best lubrication for muddy roads, oil or grease? Which would prove the most satisfactory lubricant for the steering spindle bolts in the model 57 Cadillac, in muddy weather, oil or grease? Also for the tie rod bolts?

3—Would the replacing of the platform spring in the rear of the Cadillac by a solid bar have a tendency to stop side sway and make the car hold the road better at speeds of 35 and 40 m.p.h.? The car is a roadster and the rear end seems to jump. It gives the impression of a good deal of play in the steering gear, while in fact there is very little. Could this be due to the car being too light in the rear? It is fitted with Hartford shock absorbers, which improved it very much.—J. L. Nugent, Dietz, Wyo.

1—We know of no preparation other than those on the market which effectively will prevent the cracking of patent leather. So long as we have contraction and expansion due to various temperatures we shall have cracking of this sort. The application of some substances may help to make the leather more elastic, but it is doubtful if it will prevent cracking entirely.

2—Whether to use oil or grease in spring shackle bolts depends on what sort of cups the maker has fitted to them. If grease cups have been fitted, he intended that grease should be used. In the same way oil should be used if the cups are designed for this. The same rule holds throughout the chassis.

One way of lubricating shackle bolts or other similar parts if a long tour is antici-

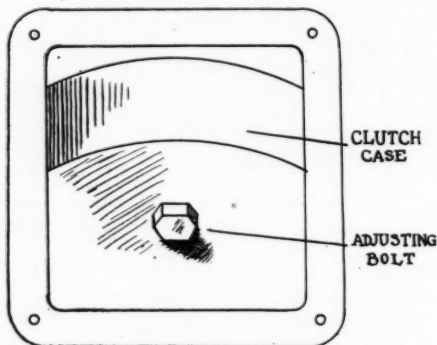


Fig. 10—Jordan clutch handhole plate removed, showing one of the three clutch-adjusting bolts

pated or in a rainy season is as follows: The parts are given an application of kerosene which finds its way through and removes all the old lubricant. Then oil is introduced, which will be taken through by the kerosene through capillary attraction. This can be followed up with a light grease, and to hold all of the lubricant in and prevent dirt and water from coming in contact with the bearing surfaces melted paraffin is poured over the parts and when cool it will effectively seal the parts for a long time. All this applies to the tie rod bolts, steering arm spindle body bolts, etc.

3—Off hand we should say to leave the spring suspension as it is, as the manufacturer has put considerable time into studying such constructions and generally adopts them only after many tests and trials. But it occasionally happens that a car is used in territory where perhaps a slightly altered construction would be preferable. This might be true in your case. It would not be much of a job to remove the cross spring

and hang the ends of the springs on a suitable cross bar of some kind. Perhaps you do most of your riding alone, which makes it impossible to get the best riding qualities out of the car. A car is designed with springs to give the best riding when carrying its maximum load. Thus a five-passenger car will handle best on a road when carrying five-passengers.

Adjusting Jordan Clutch

Q—How can I adjust the Brown-Lipe clutch on my 1917 Jordan 60 to stop its slipping? I had this clutch taken apart and the plates scraped and cleaned, but lately it is slipping quite badly on ascending hills and upon sudden acceleration—W. F. Schumann, Chicago.

If the clutch slips it is probably due to the fact that a little oil has gotten on the plates, and this can be remedied easily by washing the plates off with a little turpentine or gasoline. Access to the clutch can be gained by removing the handhole plate on the forward end of the gearset, and in washing the clutch the engine should be running and the clutch alternately engaged and disengaged. Use a squirt gun so the turpentine or gasoline can be thrown into the rear. There is a slight adjustment of this clutch and the adjusting bolts are shown in Fig. 10. There are three of them. Turning these to the right puts more tension on the clutch spring. To the left loosens the spring. The clutch throwout bearing should be lubricated at least once a month, with a good heavy cylinder oil, preferably, 600-W.

Truck Service Adjustments

Fort Wayne, Ind., Editor MOTOR AGE—From an article on page 21, Aug. 29 issue, "Looking Service in the Face," I judge there is some feeling that the motor truck service might require some improvement. I believe that this is true, and I further believe that improvements in this line can only be made through system and reliable service reference, under organized plans and managing head office.

Adjustments must be made that are impartial and in the best interests of the public. This requires a head engineering office; the business of a corporation or individual must be protected and at the same time the motor truck must be public and co-operative on public highways to obtain maximum efficiency.

Service must include all trucks and all

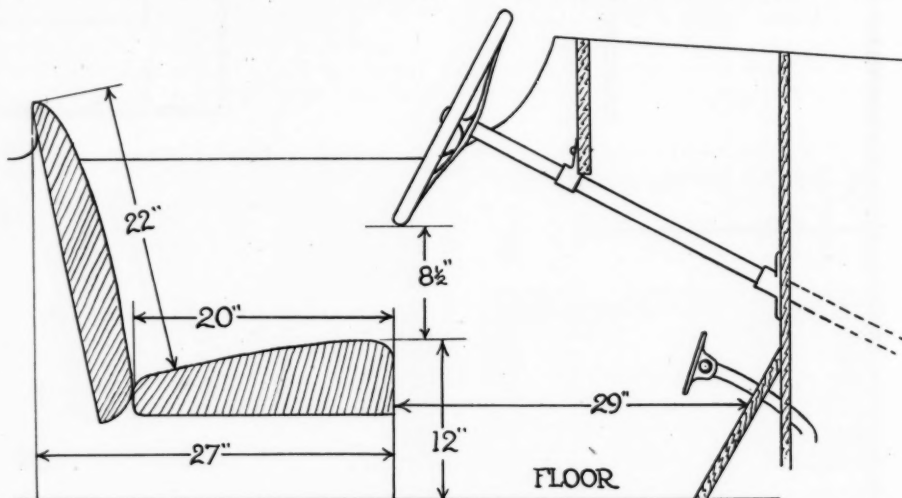


Fig. 11—Drawing to help readers determine location of seats, steering wheel, etc., when rebuilding a car

kinds of business. In my judgment the public cannot obtain reliable service under the management of a truck agency or manufacturing company who use it as a side line to sell trucks. They show too much partiality, their object is, sell what they manufacture regardless of whether it fits the business or not. The public should not be put at the mercy of a commission truck salesman that offers everything in the service line and delivers nothing after he obtains his commission. The foundation must first be laid by a service engineering company. It is then possible to design forms for service data reference and to organize service stations that will protect the public in the motor car service line and look service squarely in the face. The unorganized business in the United States is the most wasteful in the world, that has been proved in the food saving in this war.

To the best of my knowledge no factory has ever accomplished efficiency, without first organizing a plan and then designing a system and forms placing it under a directing head and adjust their affairs and weed out the loss of time and money that were exposed through the written facts shown by system reference to be of no market value to the factory.—G. S. Gunderson.

Troubled with Squeaky Brakes

Q—What makes a brake screech? What is the most simple and practical way of stopping it, both temporarily and permanently, if it can be permanently stopped?—Mac L. Nichols, 1266 West Third street, Los Angeles, Cal.

Squeaky brakes are a common trouble. The condition usually is caused by dirt being forced in the pores of the lining when the brakes are applied. It can be removed temporarily with kerosene. A preventative is to mix a small amount of resin and castor oil so that the mixture is a fluid and then apply a small quantity to the brake bands. One of our readers states that he has found the following very effective in remedying squeaky brakes.

Drive a screwdriver between the brake band and the drum on the side opposite the pull levers, thus raising the band at this point slightly. Then take a coarse hacksaw blade and saw a section of the lining about 1½ in. long out, thus leaving a little gap in the circumference of the lining. After this is done to both wheels, take the car out, get a good start and then put on the brakes hard. Notice how much better they hold and the absence of any squeak. There seems to be no scientific reason for this, but it is a practical fact which can be demonstrated on any car with contracting band brakes.

Rhymes with "Weed"

Q—How is the word "Hvid" pronounced?—D. V. K., Kentland, Ind.

It is pronounced as though it were written "Veed."

Carburetion

Miller Carburetor on 1910 Car

Q—Is the Miller Carburetor Co. still in business? What do you think of their carburetor? Do you think it would perform in 1910 Cadillac engine?—Fred Schuman, Manchester, Iowa.

The Miller carburetor is made by the Harry A. Miller Mfg. Co., Los Angeles,

Cal. This carburetor ranks very favorably. You have only to look at the results on racetracks to see what it can do or has done. Practically all the racing cars use it, with the exception of the Packard driven by de Palma, who always has used a Zenith on this car. We have come across cases where owners have secured better results on old cars by fitting a Miller carburetor. This, of course, applies to other carburetors also, but there is no reason why the Miller should not be all right for a 1910 Cadillac, unless the engine is in bad shape. No one should expect a modern carburetor to give a new lease of life to an old car that is just this side of the junk pile.

Float Level Probably Too High

Q—What repairs are necessary on the Stewart vacuum tank or Stromberg carburetor on the Jordan 60, 1917, when the engine chokes with gas upon stopping? If the engine is stopped for 10 min. and then an attempt is made to start it again, without using the choker at all, the engine seems overloaded with gas, but when the gas supply is shut off between the vacuum tank and carburetor it starts normally and easily. I have had considerable trouble with this carburetor leaking when the engine is shut off, but the local service men seem unable to do anything for it.—W. F. Schumann, Chicago.

Your carburetor is carrying too high a level of gasoline, caused, no doubt, by some derangement of the float mechanism. Disconnect the gasoline line at the carburetor and then remove the hexagon nut under the float chamber which carries the seat for the float valve. Examine the seat for dirt

or foreign particles. If there is an obstruction of this seat, it prevents the float valve from seating and thus allows too much gasoline to enter the chamber. The same may be caused by a leaky float.

Rebuilding

Twelve-Cylinder Speedster

Q—Publish sketch of a two-passenger sport roadster with a wheelbase of 142 in. suitable for a twelve-cylinder, 160-hp. engine. I expect to build a two-passenger roadster to have some unusual features. The car should have a very long hood, somewhat like a racing car, except for a short tail. It should have fenders without running boards and should carry two spare tires at the rear. It should also have an exhaust line running along side of the car to rear.—John L. Fisher, Biloxi, Miss.

A side view of a car embodying these features is shown in Fig. 12. As long as you are thinking of putting in a twelve-cylinder engine in the car you will need two exhaust pipes, one on each side. This could be arranged differently, so that both pipes came into a common lead in one side, but a pipe on each side would be the better arrangement. The long undershield shown will not only help to keep the under structure clean but also syphon out the hot gases in the engine compartment. Two extra wire wheels or tires can be carried on the rear deck, as shown. This is better in some respects than carrying the tires in a vertical position on a bracket fastened to the extreme rear, as it relieves undue weight.

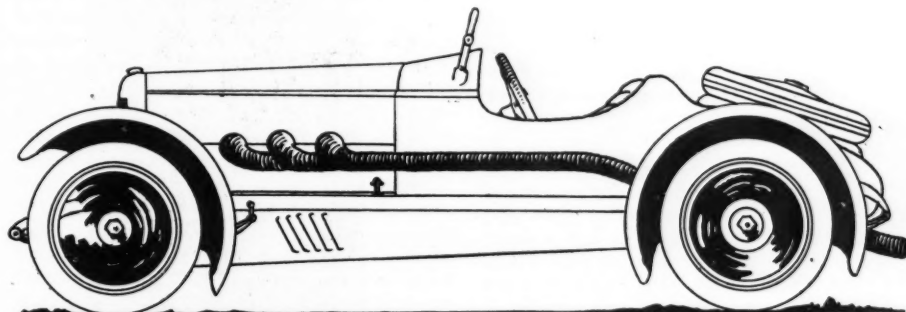


Fig. 12—Suggestion for speedster using 160-hp. twelve-cylinder engine and having wheelbase of 142 in.

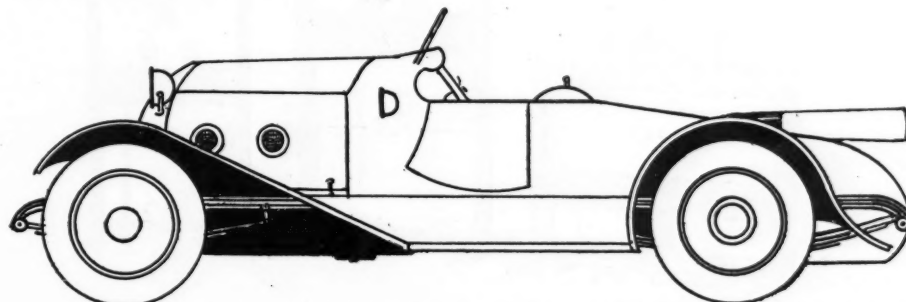
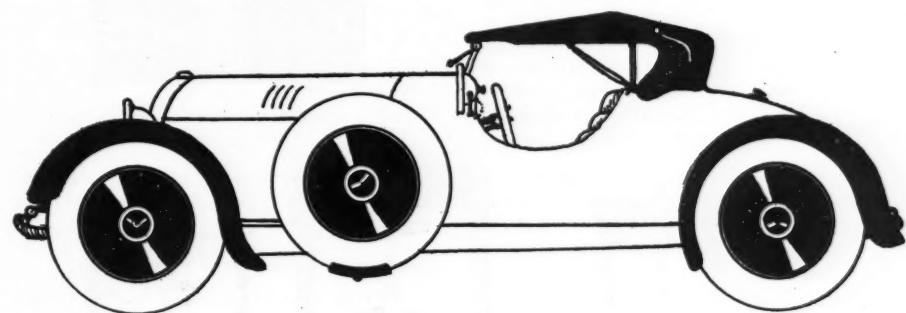


Fig. 13—Two more speedster designs for those who want something a little out of the ordinary

Service Equipment

Manley Garage Presses

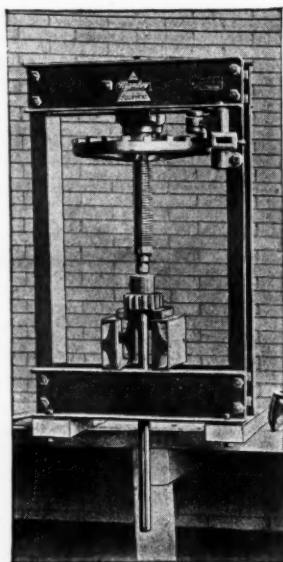
THE Manley line of 22-ton presses has been designed specially for motor car work. Four different types and sizes to suit conditions in the garage or shop are offered by the manufacturer, the United Engine & Mfg. Co., Hanover, Pa. All the presses are of the screw type, and each one is equipped with a two-speed leverage. The Universal Auto press is so proportioned as to its upper part that it will take all ordinary garage work. The lower part with its 42-in. clearance will admit every part used in a car and will take care of press jobs on truck wheels, which vary from 34 in. to 42 in. in diameter. The upper press takes work 18½ in. wide by 19 in. under the screw; the lower press, 42 in. wide with a maximum distance between tables of 21 in. The maximum distance from screw to lower table is 46 in. The total height over the screw is 76 in. Floor space is 46 by 30 in. Weight, with complete equipment, is 450 lb. The Manley garage and shop press No. 1 has a clearance of 32½ in. between the uprights while No. 2 has a clearance of 26½ in. No. 1 has every feature of the Universal Auto press except the 42-in. clearance. It is very powerfully constructed, having 5-in. channel uprights and 7-in. channel top frame and table bolster. It will handle the whole range of motor car work, except the larger truck wheels, and has the same two-speed leverage and easily-adjusted table as the Universal model. It will admit a chassis frame for straightening and the screw and handwheel construction permit a blow upon the screw without injury. No. 2 is a lower-priced press for shops which do not require the capacity in width and length of work of the other two. It is the same as No. 1, except in dimensions. No. 1 occupies floor space 36 in. square, No. 2 30 in. square; net weight of No. 1 is 400 lb., No. 2 310 lb. Both No. 1 and No. 2 have a wide field of application, as they handle work requiring heavy pressures and of long length, which a geared arbor press of less than three or four times their cost cannot, it is claimed. The Manley bench press is the top half of

the Universal Auto press and is designed to be mounted on a bench, as shown, or some other suitable support. It has capacity in width and distance under the screw to handle a very large proportion of garage work. It is intended for those garages and shops which must have a press at a low price to meet present needs. The bottom part of the Universal can be purchased later and the two will fit together perfectly. The features of the larger presses are found here also. It has the same screw, the same hand wheel, the same double leverage and the same specifications as the Universal. Capacity in width is 18½ in. and under screw 19 in.

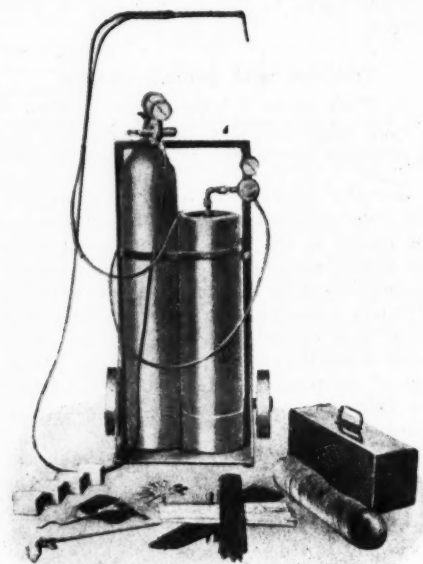
Dyer Welding Outfit

The combined welding and carbon-removing outfit, style A, manufactured by the G. H. Dyer Co., Cambridge, Mass., consists of standard style B welding torch with 10

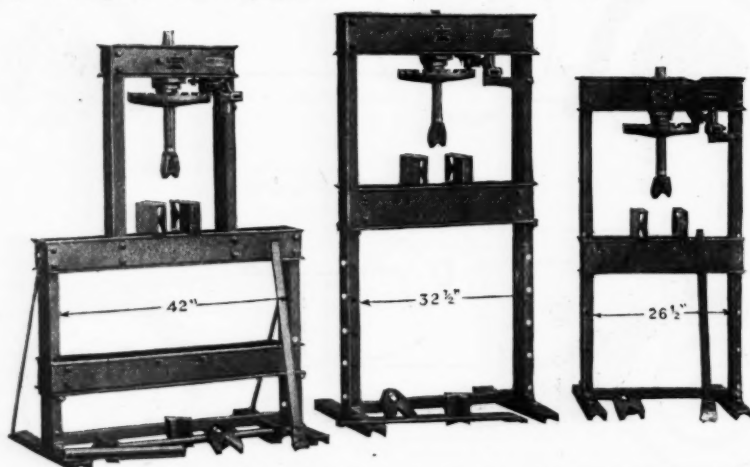
tips Nos. 0 to 9, carbon-removing gun, double-gage oxygen regulator, single-gage acetylene regulator, pair of goggles, two 10-ft. lengths of high-pressure hose with connections, Prest-O-Lite tank connection, fluxes for brass, steel, cast iron and aluminum, steel welding wire, three sizes cast-iron sticks and aluminum sticks, steering carrying case with lock, truck and instruction book. The tanks are not included. For all practical requirements the cost of acetylene can be ascertained by figuring the oxygen consumed and assuming the same quantity of acetylene has been used, since in ordinary welding work approximately equal parts of these gases are consumed. Style B, a combined welding, steel-cutting and carbon-removing outfit, consists of standard style B welding torch with ten tips Nos. 0 to 9, standard style A steel-cutting torch with three tips and roller guide, carbon-removing gun, high-pressure



Manley bench press, which is upper part of Universal



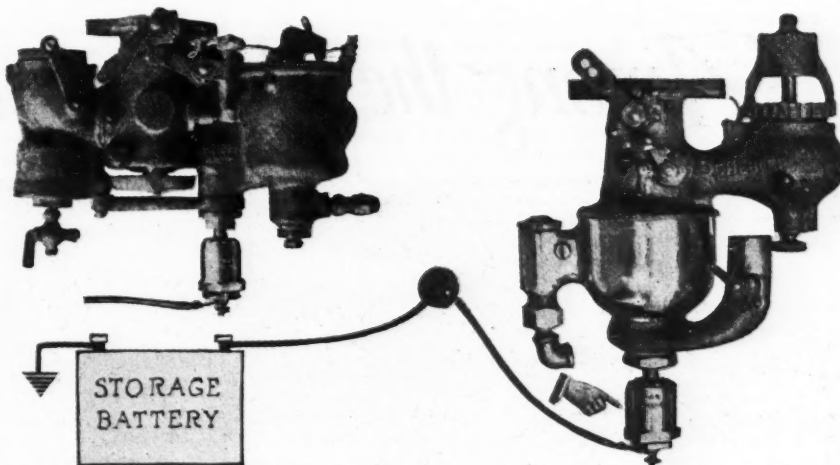
Dyer combined welding and carbon-removing outfit



Manley 22-ton presses: The Universal Auto, at the left; No. 1, second from left; No. 2, second from right; and the Universal pressing bushing out of a 42-in. truck wheel



acetylene regulator with two gages, high-pressure oxygen regulator with two gages, two 10-ft. lengths of high-pressure hose with connections, pair of goggles, Prest-O-Lite tank connection, two drop-forged wrenches, cast-iron, steel, brass and aluminum fluxes, cast-iron, steel and aluminum welding rods or wire 2 lb. each, steel carrying case with padlock and instruction book. Tanks are not included and the truck is extra. This outfit is of unlimited range both in welding and cutting, meeting all practical requirements for general repairing, etc. Regulators are of the most approved type with gages giving both pressures on the tank and line. The welding and cutting torches are of the best grade, and the combination is built for the most severe requirements. The same concern puts out other oxy-acetylene apparatus, including a brazing and soldering outfit.



Thorwald's electric carburetor heater, showing methods of installation on Schebler, right, and on Rayfield

The Accessory Corner

Spoktite

Spoktite is a liquid that swells shrunken wood, so that when applied to wheel spokes at the hub and felloes it refills the pores of the wood, swells up the cracks and makes the spokes permanently tight. It is made by the Woodtite Laboratories at Modesto, Cal., and sells at \$1.50 a half-pint. The wheel should be dry and clean before application. The bolts at the hub are loosened, flanges pried out $\frac{1}{4}$ in. and Spoktite applied. After 20 or 30 min. the bolts can be tightened. A few hours after applying the squeaks will stop and the wheel will be tight and sound.

Electric Carburetor Heater

The electric carburetor heater made by the Thorwald Mfg. & Sales Co., 1307 Jackson street, Omaha, Neb., should be installed by some person capable of judging just which is the most adaptable place to apply the heat. For instance, in the Rayfield carburetor it is best to enter the small

sub-chamber between the float chamber and the needle valve, because there is less gasoline to heat and also it is the first to enter the cylinders. In the Schebler carburetor, where the needle valve is in the center of the float chamber, it is necessary to heat the gasoline in the float chamber. If the carburetor has a drain cock the heater can be inserted in its place. In an installation on a Stewart carburetor it is necessary to drill and thread a hole into the float chamber. This can be done quickly with the carburetor removed from the engine. In rare cases the wall of the carburetor may be too thin for the threads to form a tight joint. In that case the joint should be soldered. Install the switch on the dash or wherever the driver desires. Run a line from one post of the switch to the screw on the heater, using the spring terminal which is supplied to attach the line to the screw. If the car has a 6-volt grounded starting system, you can wire the other post of the switch to the live post on the generator cut-out switch. If the starting battery is more than 6 volts, run the wire from the switch to the 6-volt pole of the battery. Try a battery tester between the pole and the frame of the car to make sure you have selected correctly. In the car of a two-line system try a ground wire to each battery pole. If one is alive, wire heater to that pole. If neither is alive you must wire the heater to one and provide a

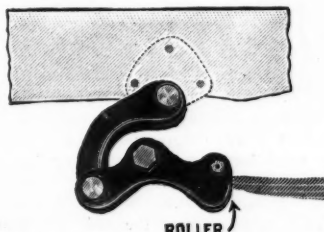
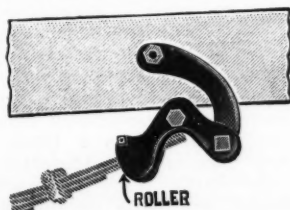
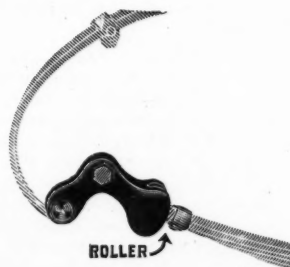
separate ground line to the other with some provision for breaking it when not in use. Turn on the switch a minute or two before starting the engine. Open the throttle wide, so vapor can enter the manifold. Do not use the heater when the carburetor is empty.

The White Stripe

The Advance Automobile Accessories Corp., Chicago, is bringing out a transmission lining for Ford cars that can be identified instantly by a white stripe running along the center. A treatment has been worked out, whereby the lining is made to resist the action of hot oil on cotton fabric. A mechanical method of applying the treatment to the woven fabric also has been developed, with the result that the White Stripe solution thoroughly saturates every fiber of the lining, making it retain its heat and oil-resisting qualities longer than usual. The lining is to be marketed both in rolls and strips of three to the box. The retail price for each box of three, east of the Rockies, is \$2, and from the roll the retail price is 32 cents a foot.

S. & S. Shock Absorber

The S. & S. is a roller bearing shock absorber, absolutely springless, working on a leverage principle and adapting the weight to the spring. One of the principal features of the device is the elimination of rebound. The illustrations show the attachments to the different styles of springs. The equipment is being installed on the rear end of the rear springs, although some cars are equipped with the extreme front end attachment, which adds considerably to the riding quality of the front seat. While the attachments seem simply to lengthen the spring, this is not the principle of the S. & S., as a spring that is made longer will not have the riding quality or reduce the rebound that a shorter spring with the S. & S. attachments will, it is claimed. These shock absorbers are made by the Starkweather-Snook Corp., Fort Madison, Iowa.



S. & S. shock absorber attachments to different styles of springs

Among the Makers and Dealers



FEDERAL IN STREET DEPARTMENT SERVICE—This is a 3½-ton Federal equipped with a steel body with a capacity of 3 cu. yd. and a power dumping hoist. Power to drive the small air compressor is obtained by a sprocket chain take-off to the left from the truck propeller shaft. Power to drive the bucket hoist is obtained by another take-off to the right by a sprocket chain from the same shaft

HARRY B. WILLOWER Is Dead—Harry B. Willower, general sales manager for Gramm-Bernstein Motor Truck Co., Lima, Ohio, died recently.

Whitson Now with Panhard Truck—C. W. Whitson, formerly with the Fulton Motor Truck, Farmington, L. I., has been appointed general sales manager of the Panhard Motors Corp., Grand Haven, Mich.

Bryant Joins Belting Maker—George T. Bryant, formerly with the Russell M. Seeds Advertising Agency of Indianapolis, Ind., has become sales manager for the Hide, Leather & Belting Co., Indianapolis, Ind., maker of leather belting and parts for passenger cars, tractors and trucks.

Butler Says It Helps Save—The Butler Mfg. Co., Indianapolis, Ind., has prepared to take care of increases in the number of car owners who want cylinders repaired rather than buying new cylinder castings outright, which, it states, will help the car owner save and conserve to-day as no other thing will. Of course, the difference in time, material, etc., required to machine a new casting as compared to the time required to regrind the cylinders and make a new set of pistons is cited as the reason for this means of conservation.

Another Car Dealer Takes on Truck—The Wolfley Auto Co., Mitchell Distributor and dealer at St. Joseph, Mo., Hiawatha, Kan., and Falls City, Neb., has been appointed distributor for the Fulton truck in Kansas, Western Missouri, Oklahoma and Southeastern Nebraska. Headquarters for truck distribution will be maintained at Kansas City, where a service station and parts supply station for the territory are being installed. Truck service station also will be established at the company's other locations. Charles D. Wolfley will be in charge of the Kansas City headquarters, where passenger cars will not be handled. W. E. Wolfley will continue to make his headquarters at Hiawatha. The

Falls City branch is operated by the Ball-Wolfley Auto Co., and there Overlands also are sold. J. W. Latto is assisting Mr. Wolfley at Kansas City.

Redlin Joins Erd Motor—A. W. Redlin, for the last two years division superintendent of the Mitchell Motors Co., Racine, Wis., has been appointed assistant works manager of the Erd Motor Co., Saginaw, Mich.

Glenn L. Martin Tests First Plane—The first plane produced by the Glenn L. Martin Co. has been completed successfully and has flown from Cleveland to Dayton, Ohio, for experimental test with a crew of four men.

August Is Acme Record Month—The Acme Motor Truck Co., Cadillac, Mich., had the best month in its history during August. More trucks were sold and more delivered than at any other time since the Acme was placed on the market, and the outlook for future business is reported by officials to be most satisfactory. More agencies are being established.

Gibson Co. Calls in Its Salesmen—The Gibson Co., Indianapolis, Ind., jobber of motor car accessories, has notified its patrons that all traveling salesmen have been called in and that orders hereafter must be placed by mail or telegraph. The shortage of men and the desire to release as many as possible for the war has decided the company to utilize the remaining road salesmen for service at the main office.

\$5 a Day Granted by Canadian Ford—Approximately 2500 employees of the Ford Motor Co. of Canada, Ltd., of which 1900 are employed at the Ford City plant, will benefit by the new \$5-a-day wage scale for 8 hr. This will affect every employee of the Canadian plants who has been in the service of the company for three months or more. The former minimum wage is 50 cents an hour. Canadian plants are located at Montreal, Toronto, London, Winnipeg, Saskatoon, Calgary, Vancouver and St. Johns, N. B. War

conditions and lack of material have compelled the company to cut its staff considerably, but it is using all the men possible at present.

McMullen Is Western Timken Representative—George C. McMullen has been appointed western representative of the Timken Roller Bearing Co., with headquarters in San Gabriel, Cal.

Wood & Spencer Expands—The Wood & Spencer Co., engaged in the manufacture of machine parts for airplanes and other war munitions at Cleveland, Ohio, has leased land directly in the rear of the factory. The property, which is 78 by 158, was acquired for expansion after the war.

Lansing Forge Enlarges Plant—The new addition to the Lansing Forge Co., Lansing, Mich., is expected to be completed by Oct. 1. The building is 67 by 80 and will be used for dies and stock storage. The company took over the property of the old Emergency Drop Forge Co., which went into the hands of a receiver. The new organization consists of outside capitalists who make a specialty of forging business. Many changes have been made in the old plant which have modernized it in every way.

Gear Makers to Hold Meeting—The semi-annual meeting of the American Gear Manufacturers' Association is to be held at the Onondaga hotel, Syracuse, N. Y., Sept. 20-21. Following is that portion of the program which has been completed: "Priority," by Charles A. Otis of the Priority Committee; "What Is the Possibility of Women Becoming a Permanent Factor in the Gear Industry?" by W. H. Diefendorf; "Trade Acceptances," by C. E. Crofoot; "The Outlook of the Steel Supply," C. E. Stuart, secretary and treasurer of the Central Steel Co., Massillon, Ohio.

Northern Foundry to Double Size—The Northern Foundry Co., Marinette, Wis., organized early this year by Marinette, Milwaukee and Racine capital, to engage in the manufacture of automotive and agricultural castings, has concluded arrangements to double the size of its plant by taking over adjoining buildings. The present force of sixty will be increased to 125 or more by the end of September. Much of the output is being taken under contract by the J. I. Case T. M. Co., Racine, Wis., maker of passenger cars, tractors and other power farm machinery. J. M. Fitzpatrick is manager of the Marinette foundry.

Service on Continental Parts—Distribution of parts is being simplified and centralized for Kansas City territory—and the entire central part of the United States—through the General Auto Parts Co., which opened a Continental engine parts station recently. The officers are: H. A. Dougherty, Republic truck distributor in this territory, president; Estel Scott, general manager of General Motors Truck Co., Kansas City, treasurer; R. L. Doyle, assistant manager of General Motors Truck Co., vice-president; L. A. Phillips, formerly service manager for the Oakland company at Kansas City, manager. Parts for eighty-five types of Continental engines are already stocked, arranged in bin stacks. Later a shop will be equipped for overhauling engines. No storage for vehicles will be provided, however, the expectation being that engines will be shipped in or taken out of cars at local garages and transported to the General Auto Parts Co. shop. Engines will be overhauled, new parts installed and the engines block-tested as at the factory. Similar Continental motor parts stations already

are operating in New York and San Francisco. Nearly 70,000 Continental engines have been sold in cars, trucks and tractors out of Kansas City.

Mason Tire Declares Dividend—The Mason Tire & Rubber Co., Cleveland, Ohio, declared a quarterly dividend of 1¼ per cent on the preferred stock, payable Oct. 1 to stockholders of record Sept. 10.

Forbes Joins Fulton Truck—T. P. C. Forbes has been made assistant sales manager of the Fulton Motor Truck Co. Mr. Forbes has been general traveling representative for the Fulton for nine or ten months.

Eldredge to Handle Fletcher Sales—Frank M. Eldredge, Detroit, advertising and publicity expert, has assumed entire charge of the sales and advertising department for L. V. Fletcher & Co., New York carburetor manufacturer. He has been handling all the national advertising for the company for the last year and will now add the sales to his other duties. He will still continue his publicity and sales promotion bureau.

Dauch Tractor Makes Two Changes—The Dauch Mfg. Co., Sandusky, Ohio, which produces Sandusky tractors, has made two changes in its personnel. L. E. Willson has been appointed general sales manager, and J. W. Wellington general manager. Mr. Willson was formerly vice-president in charge of sales of the Briscoe Motor Corp., Jackson, Mich., and Mr. Wellington was formerly production manager of the New Castle, Ind., plant of the Maxwell Motor Car Co.

Traverse City Is Napoleon Motors—The Traverse City Motor Car Co. has decided to change its name back to the Napoleon Motors Co. An increase in capitalization from \$150,000 to \$500,000 has been authorized. The officers are: President, W. J. Chase; vice-president, C. E. Culver; secretary and treasurer, Frank Trude; general manager and chief engineer, J. W. Oswald. The company is engaged in the manufacture of 1-ton and 1½-ton trucks and expects to increase its production by Sept. 1.

Canadian Ford to Handle Fordson—Arrangements have been made whereby the Fordson tractor will be handled by the Ford Motor Co. of Canada, Ltd., through its branches and dealer organizations from coast to coast. Shipments have been made to Ford dealers throughout this section. The tractor will sell to the consumer at \$950 f. o. b. Dearborn, Mich., plus the freight to destination. The Canadian government had 1073 tractors delivered to the various provinces in accordance with arrangements made with Henry

Ford & Son as a means of assistance in the production campaign carried out by the Canadian food board.

Hackett Suspends Production—The Hackett Motor Car Co., Jackson, Mich., owing to difficulties in procuring materials to maintain production, has suspended operations.

McLein with Oneida Truck—E. M. McLein, formerly advertising manager of the Stegeman Motor Car Co., has joined the Oneida Motor Truck Co., Green Bay, Wis., where he will be connected with the office of the director of sales.

Wells Mfg. Co. in New Plant—The Wells Mfg. Co., Fond du Lac, Wis., manufacturing electric lighting units and other accessories for motor vehicles, has moved its plant into new quarters, consisting of a two-story fireproof building 50 by 120 ft., which makes available considerably more floor space than in its former works. The company is extensively engaged in Government contracts. Its regular line of products includes generators, coils, magnetos, timers, electric testers and complete farm lighting plants.

Rubber Workers Celebrate Labor Day—Three of the largest rubber companies in Akron, Ohio, played prominent parts in the celebration of Labor Day. Outings were held by the big concerns at various parks within the city, where preparations were made to care for 100,000 persons. The biggest affair was held in Summit Beach park, where 20,000 B. F. Goodrich Co. employees gathered. Sports and games of all kinds were participated in. Goodyear employees gathered in Seiberling park, and Firestone employees at Firestone park.

Electric Steel Absorbs Crucible—Electric Steel & Forge Co. has absorbed the Crucible Steel Forge Co., Cleveland, Ohio, and will continue and expand this business. It will purchase adjoining land on which to erect suitable buildings, install two electric furnace units, heat-treating furnaces, rolling mills, machine shop and other necessary equipment. It will have a production capacity of 9000 to 10,000 tons per annum of tool steel and alloy steel and a rolling and forging capacity in excess of this tonnage. The products of the company will include carbon and tungsten tool steel, nickel, vanadium, chrome, chrome-vanadium, chrome-nickel, silicon-manganese and other kinds of tool steel and special alloy steel. Among its specialties, besides billets and bars for the market, will be heat-treated piston rods, die blocks and rings, gun forgings, gun mount forgings, spindles, gear rings, blanks and shafts. The officers are: Presi-

dent, James H. Foster; vice-president and general manager, D. W. Wells; secretary, C. R. Cross; treasurer, A. B. Smythe.

Jones Car Man in Service—Charles E. Becker, formerly advertising manager for the Jones Motor Car Co., Wichita, Kan., has been called for service.

Handy Now with Lauton—Ralph J. Handy, former distributor of the Tonford truck attachments in Detroit, has become sales manager of the Lauton Truck Co., Youngstown, Ohio.

Bell with Cleveland Tractor—W. G. Bell has been appointed Canadian sales manager of the Cleveland Tractor Co. For the last four years Mr. Bell has been assistant sales manager in Canada for Studebaker.

Lee Tire Gives Up Branch—The Lee Tire & Rubber Co. has discontinued the factory branch at St. Louis, Mo., leaving the wholesale business to the Bittel-Leftwich Co. O. S. Johnson, branch manager, who will go to the home office, states that the factory was unable to continue satisfactory stock there for a branch.

Highway Trailer Adding to Plant—The Highway Trailer Co., Edgerton, Wis., has started work on a large factory addition, 40 by 200 ft., one and two stories high, to provide the additional facilities required to adequately handle large Government orders for trailers for hauling ordnance, munitions, aircraft, etc. About \$30,000 will be invested in the improvement.

Prepares Apprentice Course—Reo is making preparations for the installation of an apprenticeship course which will be opened early in October. John H. Amiss, for seven years superintendent of the Lima Consolidated Schools, Howe, Ind., has been engaged as educational director. Shop mathematics, lay-out work, blueprints and mechanical drawing will be some of the studies taught in the classroom. The course, as now mapped out, will require three years to finish, the apprentice receiving at the end of this time a certificate which vouches for his skill as a mechanic. The age limit of the applicant has been set at from sixteen to nineteen years. The apprentice course is not confined to boys whose fathers may be Reo employees, but covers all applicants and is not as exclusive as the old course. Machines for instruction are being installed, as well as benches and other equipment for the student use. There are now fifteen applications filed for entrance, and when the school is in full swing the company will have at least 200 apprentices in the course.



FIRE PROTECTION FOR THE BOYS IN CAMP—Camp McClellan, near Anniston, Ala., has a fire department equal to that of any camp or any city of its size. Two White combination chemical and pumper fire trucks have been added to the equipment. Their speed and pumping capacity each are 750 gal. per minute. The crew consists of men from some of the largest departments in the country. The first sergeant of the company, John Roach, was a member of the fire boat company on the lake front in Chicago. Mechanic Chancky, former chauffeur of the Rock Island fire department, is an expert driver and repair man.

From the Four Winds

Tractors at Work in the Fields of Peru



THE photograph showing three tractors at work in one field in Peru not only is unusual for that reason but is unusual because it represents the initial purchase of a battery of twelve Moline-Universal trac-

tors which the owner of the land expects to keep his entire 30,000 acres in cultivation.

The tractors are being operated by three Japanese drivers. It was impossible to teach native Peruvians to handle the trac-

tor, but it took only 2 or 3 hr. to teach the Japanese so that within a few days they handled the outfits perfectly. The tractors are pulling 14-in. two-plov gangs.

The owner expects to keep his 30,000 acres in cultivation when his battery of twelve tractors is complete, because a vast area is in sugar cane, which he will replant in anywhere from six to sixteen years. The preparation, seeding and cultivation of his cotton fields and such areas as he sets aside for corn will be the principal work for the tractors beyond adapting them to the cultivation of cane as rapidly as possible.

Ed L. Carlmark, a Moline Plow Co. expert, demonstrated that the tractor also could replace the coal-burning steam engines used to haul the cars of cane in from the field to the mill on the narrow gage railroad. One tractor pulled eight cars of cane in the test at less than half of the cost.

The owner of the plantation is a graduate of the University of Wisconsin and can be seen standing just in front of the rear tractor. Mr. Carlmark is shown in the center of the photograph.

MORE Ground for Selfridge Field—Eighteen hundred acres adjoining Selfridge Field, Mount Clemens, Mich., have been acquired and will be added to the field for aviation instruction purposes. Part of the tract will remain untouched and granted to present tenants.

Goodyear Salvages \$3,000,000 in Year—Goodyear Tire & Rubber Co. made in one year a salvage of \$3,000,000 worth of materials that might have been wasted were it not for the co-operation of its 20,000 workmen. This is a larger amount than the output of finished product of ninety-eight per cent of the country's manufacturing concerns.

Fire Department Motorizes Its Steeds—The St. Louis, Mo., fire department has bought three Auto Horses to replace horse teams formerly used. A recent ordinance provided for the motorizing of the fire department, but recent advances in cost of motor apparatus exceeds the estimated cost, so the Auto Horse will draw the horse apparatus and thus keep within the bounds. The Auto Horse is made by the One Wheel Truck Co. of that city.

Canadian 1919 Registrations Pile Up—The Montreal, Canada, Automobile Association has compiled the following statistics of motor car licenses issued for 1919 to date in various provinces: Prince Edward Island, 564; Nova Scotia, 7290; New Brunswick, 1500; Quebec, 23,337; Ontario, 97,500; Manitoba, 22,214; Saskatchewan, 44,267; Alberta, 27,000; British Columbia, 13,500. Ontario also has registered 7000 trucks in addition to passenger cars.

Ohio Dealers Hold Successful Show—The motor car show held in conjunction with the annual Ohio state fair was one of the most successful displays ever given by the Columbus Automobile Show Co., an organization of local dealers. The attendance at the fair was extra large, despite the unusual war conditions and a considerable amount of rain which fell during the week. A large proportion of the attendance was from the rural sections of the state, and the show was one of the centers of attraction. Quite a few sales were made during the week, and dealers were

exceedingly well pleased with the results. Trucks and trailers also were shown.

Browne Adopts French Orphans—George W. Browne, first president and still a director of the National Automobile Dealers' Association, distributor of the Overland and Willys-Knight in Wisconsin, with headquarters at Milwaukee, Wis., has adopted ten little fatherless children of France. Three of them, two brothers and a sister, already have acknowledged Mr. Browne's generosity and assuring him of their gratitude in a letter.

254,722 Licensed Cars in Michigan—Sept. 1, 1918, there were 254,722 registered or licensed cars in Michigan. According to the records of the National Automobile Chamber of Commerce 215,001 cars were registered in the Wolverine state Jan. 1, 1918. This would make 39,721 new cars in the state. The registration records also show that of the 254,722 cars, 229,762 were passenger cars and 24,960 were commercial vehicles. The number of

motorcycles registered was 7452, and there were also 22,648 licensed chauffeurs Sept. 1. The total fees collected up to Sept. 1 were \$2,840,995.35.

Road Builders to Convene in Michigan—Arrangements are being completed by the Michigan state highway department and its representatives for the holding of the State Highway Department and Commissioners Road Convention at Alpena, Mich., Sept. 16-17. It is expected that the county commissioners and most of the highway commissioners of the townships of thirteen counties will be in attendance.

Illinois Has Road Movie—The Illinois Highway Improvement Association has invaded the movie field with a two-reel film "Through Illinois Over Unchanged Roads in a World of Change" in its campaign for the \$60,000,000 good roads bond issue. Officials of the association state that this is the first time in the history of the United States that "the widening uses of the highway have been told in a motion picture story, with the various type of vehicles passing in review before the spectator." The picture will go to theater managers without charge.

Willys-Overland Eliminates Waste—Willys-Overland has its watchful eye on waste. In giving engines the block test, for instance, every engine is hooked on to a dynamo which is set at the proper load, and all the current generated by these engines is used in the factory for turning machinery of various kinds. In the woodworking department every bit of the sawdust is collected and saved for packing and other purposes, while the wood scraps which are not fit for any other use are burned under boilers for power purposes. Where small parts are machined in oil, the parts are placed in a receptacle made for the purpose. The machine works much like a cream-separator. The machined parts covered with oil are placed in the center and then revolved at a high rate of speed. Centrifugal force automatically separates the oil, which is thrown through the screen in the receptacle holding the oily parts.

Coming Motor Events

SHOWS

Sept. 14-21—Chicago, Automotive and Accessories Exposition.
Sept. 14-17—Dallas, Tex., seventh annual motor car show.
Oct. 12-19—Atlanta, Ga., Southeastern fair.

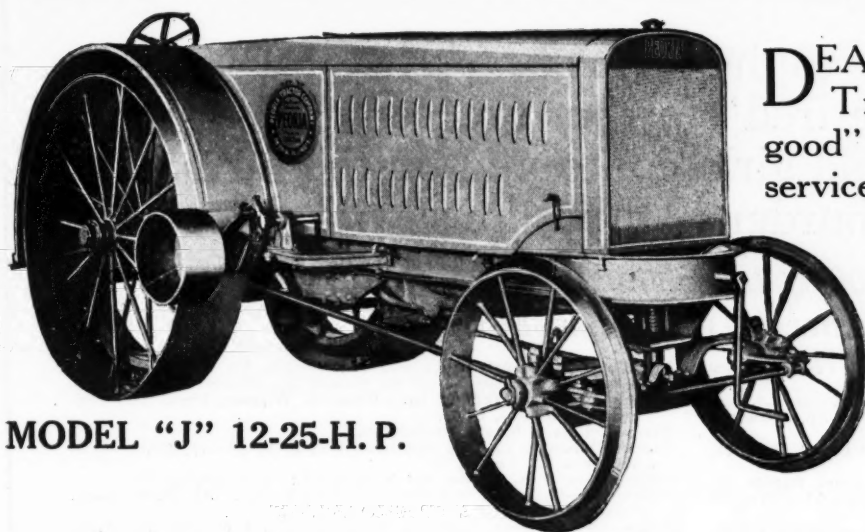
TRACTOR DEMONSTRATIONS

Sept. 9-14—Syracuse, N. Y., state fair.
Sept. 9-15—Madison, Wis., state fair.
Sept. 17-20—Riverhead, L. I., county fair.
Sept. 19-21—Harrisburg, Pa., state and national.
Sept. 30-Oct. 4—Trenton, N. J., fair.

CONVENTIONS

Oct. 28-Nov. 2—Chicago, N. A. A. J.

Big TRACTOR Sales



MODEL "J" 12-25-H. P.

DEALERS who sell the "Peoria Tractor" positively "make good" because of the powerful service it renders the farmer in actual work. It is a better buy than any similar size tractor on the market. It successfully performs every test. It is a profitable—saving—investment. The "Peoria" Tractor is built for the farmer who wants a high-class tractor at a reasonable price.

"PEORIA" Tractor Efficiency

The many tests of the Peoria have proven its efficiency and makes it a positive leader among tractors. You can depend upon it doing every kind of farm work. It is "insurance" of big crop production. It is simple in construction and easy to operate.

Positive SERVICE

Will be assured the Farmer who buys the "Peoria" Tractor. The powerful climax motor produces 40% reserve power. All units are standardized and quality is the main consideration. Cheap kerosene is used, which means economy in operating cost. It is manufactured by men who have had many years of experience in the building and operating of tractors.

**40 Per Cent
RESERVE POWER
LOW FUEL COST**

50% Increase in WORK

Will be the reward of the farmer who uses the "Peoria" Tractor. The war warrants the use of the tractor; economy demands it—labor conditions make it necessary. It speeds up greater production.

In Illinois and Iowa there are 170,000 farms of 100 acres and up—or 90% of immediate tractor prospects are in these two states. The Agricultural Colleges are establishing tractor instruction. Statistics show the cost of feeding 6 horses is \$900.00 and up per year.

Illustrated Descriptive Circulars will be mailed upon request. Write today for facts about the "Peoria."

PEORIA TRACTOR CORPORATION
PEORIA DEPT. 40 ILLINOIS

DELCO-LIGHT

INCREASES FARM EFFICIENCY

1. Saves labor.
2. Attracts labor to the farms.
3. Solves the "retired" farmer problem.
4. Keeps boys and girls contented on the farm.
5. Lightens the burdens of the housewife.

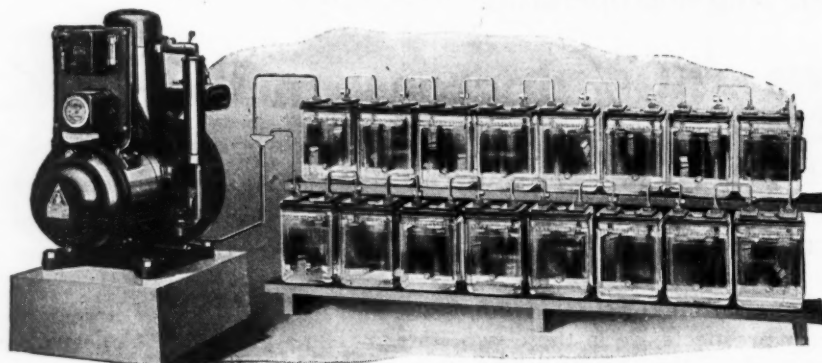
More Than 50,000 Delco-Light Plants in Actual Use

LIST OF DELCO-LIGHT DISTRIBUTORS

Atlanta—The Domestic Electric Co., F. K. Runyan, Pres., 66 West Mitchell St., Atlanta, Ga.
 Baton Rouge—George M. Foos, 207 Third St., Baton Rouge, La.
 Birmingham—The Domestic Elec. Co., 406 N. 20th St., Birmingham, Ala.
 Boston—Home Electric Light & Power Equipment Co., J. A. High, Pres., 135 Federal St., Boston, Mass.
 Cedar Rapids—W. H. Moulton, 323 S. Third St., Cedar Rapids, Ia.
 Charleston—The H. & S. Electric Co., H. R. Stapp, Vice-Pres. & Gen. Mgr., 812 Kanawha St., Charleston, W. Va.
 Charlotte—Home Light & Power Co., S. O. Lindeman, Mgr., 218 W. First St., Charlotte, N. C.
 Chicago—Stover Company, Inc., I. K. Stover, Pres., 204 West Randolph St., Chicago, Ill.
 Clarksburg—Home Elec. Equipment Co., H. T. Gates, Secretary, 456 Pike St., Clarksburg, W. Va.
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 Columbus—J. J. Munsell, 11 E. Rich St., Columbus, Ohio.
 Dallas—Cox & Cooper, 209 Lane St., Dallas, Texas.
 Davenport—Electric Equipment Co., 222 Ripley St., Davenport, Ia.
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 Denver—Barnett Ranch Lighting & Appliance Co., E. H. Frazier, Mgr., 1525 Sixteenth St., Denver, Colo.
 Des Moines—The Electric Farm Lighting Co., V. R. Evans, Mgr., 1212 Locust St., Des Moines, Iowa.
 Detroit—M. L. Lasley, 23 Elizabeth St., East, Detroit, Mich.
 Fargo—Ashelman Bros., Inc., S. D. Briggs, Gen. Mgr., Broadway & Front Sts., Fargo, N. D.
 Fort Worth—P. M. Bratten & Co., 1001 Throckmorton St., Fort Worth, Tex.
 Houston—E. A. Cox, 1112 Texas Ave., Houston, Tex.
 Indianapolis—E. L. Kruse, 60 West New York St., Indianapolis, Ind.
 Jacksonville—Claude Nolan, 916 Main St., Jacksonville, Fla.
 Kansas City—R. E. Parsons, 1322 Main St., Kansas City, Mo.
 Knoxville—East Tenn. Farm Lighting Co., Paul D. Fuqua, Mgr., 424 Union Ave., Knoxville, Tenn.
 Little Rock—W. P. Galloway, 412 Center St., Little Rock, Ark.
 Louisville—E. L. Uncapher Co., Inc., E. L. Uncapher, Pres., 325 Guthrie Ave., Louisville, Ky.
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Norfolk—R. F. Trant, 442 Granby St., Norfolk, Va.
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 Peoria—Domestic Electric Appliance Co., R. B. Cherry, Mgr., 315 S. Jefferson St., Peoria, Ill.
 Philadelphia—J. S. Snyder, 824 N. Broad St., Philadelphia, Pa.
 Pittsburgh—Suburban Electric Development Co., Al. Hattenbach, Pres., 342-344 Third Ave., Pittsburgh, Pa.
 Richmond—Suburban Lighting Corporation, 115 N. 8th St., Richmond, Va.
 Rochester—Winston Paul, 71 S. Ave., Rochester, N. Y.
 St. Louis—The Del-Home Light Co., 3317 Olive St., W. O. Waldsmith, Pres., St. Louis, Mo.
 San Antonio—Independent Electric Light & Power Co., E. J. Hermann, Vice-Pres., 205 Avenue "C," San Antonio, Tex.
 Seattle—Modern Appliance Co., E. H. Epperson, Pres., 508 First Ave., South, Seattle, Wash.
 San Francisco—Modern Appliance Co., E. H. Epperson, Pres., 606 Mission St., San Francisco, Cal.
 Sioux Falls—Home Electric Co., J. G. Petosky, Pres., 314 No. Phillips Ave., Sioux Falls, S. D.
 Toledo—E. H. Walker, 212 N. Erie St., Toledo, Ohio.
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 Calgary—B. L. Robinson, 307 Eighth Ave., West, Calgary, Alberta.
 Toronto—C. H. Rooke, Limited, 173 King St., East, Toronto, Ontario, Can.
 Winnipeg—Breen Motor Co., Ltd., T. G. Breen, Pres., Cor. Sherbrooke and Broadway, Winnipeg, Man., Can.
 Australia—W. A. Crowle, P. O. Box 635, Adelaide, Australia.
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 South America—B. C. Duffie, care Consulado Americano, Barranquilla, Colombia.
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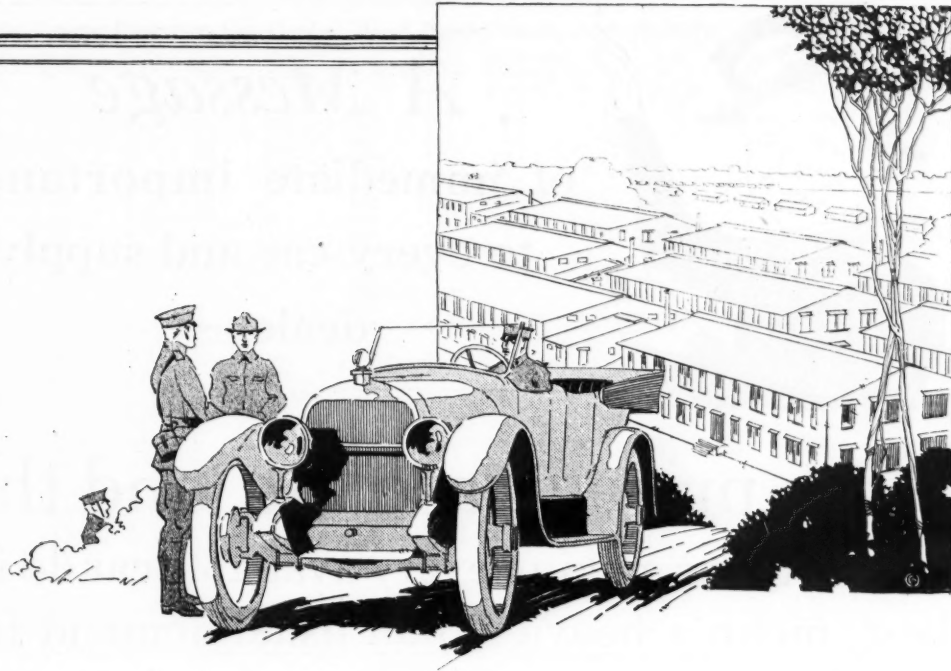
Write to nearest Distributor for further information about Delco-Light Products



A Complete Electric-Light and Power Plant for Farms and Suburban Homes—Self-Cranking — Air-Cooled — Ball Bearings — No Belts — Thick Plate Long Lived Battery. Runs on Kerosene.

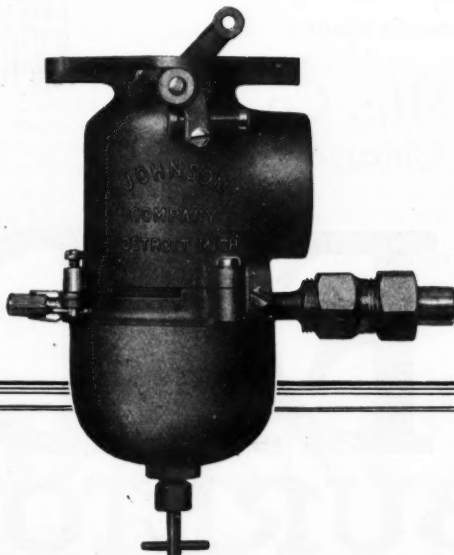
Domestic Engineering Company,

Dayton, Ohio, U. S. A.



JOHNSON CARBURETOR

Has No Springs—It
Approaches Auto-
matic Action as
Closely as a Car-
buretor Can



JOHNSON COMPANY

Makers of Superfine Instruments of Carburetion

DETROIT

MICHIGAN

BUSINESS SOLICITED FROM MANUFACTURERS ONLY

When Writing to Advertisers, Please Mention Motor Age



A Message
of immediate importance
to every car and supply
dealer—

High priced gasoline, and the necessity for making every available car do its best, mean a heavier than usual demand for Rayfield Carburetors because of their known economy.

Against that demand we have but a limited stock of material, may get little if any more, and war orders are fast absorbing our capacity.

Moral: Put Rayfields in stock now—yes, write the order now, or you may be too late.

Service stations and dealers everywhere

Findeisen & Kropf Mfg. Co.
21st and Rockwell Sts., Chicago

RAYFIELD

CARBURETOR

When Writing to Advertisers, Please Mention Motor Age

Results of Official State Tractor Demonstration Held at Minot, North Dakota, June 19, 1918, as Returned by Officials in Charge

| Name of Tractor | Draw-bar H. P. | Brake H. P. | No. Cyl. | Cyl. Bore | Cyl. Stroke | R. P. M. | No. bottoms pulled | Depth of Breaking (Inches) | Acres Plowed | Gal. kero. put in | Gal. gas. used to start | Gal. gas. used to credit | Gal. fuel used in demonstr. | Cost per Acre |
|-----------------------|----------------|-------------|----------|-----------|--------------|------------|--------------------|----------------------------|--------------|-------------------|-------------------------|--------------------------|-----------------------------|---------------|
| Lauson | 15 | 25 | 4 | 4 1/2 | 6 | 950 | 3 | 3 1/2 | 2.13 | 10 | | | 9 1/4 | .706 |
| Turner | 12 | 20 | 4 | 3 3/4 | 4 1/2 | 1000 | 2 | 3 1/2 | 1.45 | 10 | | | 5 1/2 | .708 |
| Moline | 9 | 18 | 4 | 3 3/4 | 5 | 1400 | 2 | 4 1/2 | 1.45 | | 10 | | 4 1/4 | .795 |
| Gray | 18 | 36 | 4 | 4 3/4 | 6 3/4 | 900 | 3 | 4 | 2.13 | | 10 | | 7 1/4 | .925 |
| Heider | 12 | 20 | 4 | 4 1/2 | 6 3/4 | 750 | 2 | 4 | 1.18 | 10 | | | 3 3/4 | .572 |
| Bull | 12 | 24 | 2 | 5 1/2 | 7 | 700 | 2 | 3 1/2 | 1.45 | 10 | | | 5 1/4 | .63 |
| Emerson | 12 | 20 | 4 | 4 3/4 | 5 | 800 | 3 | 4 | 1.73 | 10 | | | 5 | .51 |
| Flowman | 13 | 30 | 4 | 4 1/2 | 6 | 900 | 3 | 4 | 2.13 | 10 | | | 8 1/2 | .70 |
| Parrett | 12 | 25 | 4 | 4 1/2 | 5 1/2 | 900 | 2 | 4 | 1.18 | 10 | | | 4 1/2 | .706 |
| Hart Parr | 15 | 30 | 2 | 6 1/2 | 7 | 750 | 3 | 4 | 1.45 | 10 | | | 6 1/2 | .80 |
| Nilson | 24 | 36 | 4 | 4 3/4 | 5 1/2 | 850 | 3 | 3 | 2.13 | 10 | | | 7 1/4 | .63 |
| Waterloo Boy | 12 | 25 | 2 | 6 1/2 | 7 | 750 | 2 | 4 | 1.45 | 10 | | | 5 1/4 | .93 |
| RUMELY OILPULL | 14 | 28 | 2 | 7 | 8 1/2 | 530 | 4 | 4 1/2 | 2.27 | 15 | | | 6 3/4 | .45 |
| Liberty | 15 | 30 | 4 | 5 | 6 1/2 | 800 | 4 | 2 1/2 | 2.27 | | 10 | | 2 | .96 |
| Twin City | 16 | 30 | 4 | 5 | 7 1/2 | 650 | 4 | 3 | 2.27 | | | | 9 | .67 |
| Avery | 12 | 25 | 2 | 6 1/2 | 7 | 570 | 3 | 4 | 2.13 | 10 | | | 8 1/2 | .65 |
| Avery | 8 | 16 | 2 | 5 1/2 | 6 | 600 | 2 | 4 | 1.45 | 10 | | | 4 1/2 | .60 |
| All Work | 14 | 27 | 4 | 5 | 6 | 800 | 3 | 4 | 2.13 | 15 | | | 6 1/4 | .57 |
| Happy Farmer | 12 | 24 | 2 | 6 | 7 | 750 | 2 | 4 | 1.45 | 10 | | | 6 | .70 |
| Aultman Taylor | 30 | 60 | 4 | 7 | 9 | 500 | 8 | 4 | 5.53 | 20 | | | 19 1/2 | .64 |
| C. O. D. | 13 | 25 | 2 | 6 1/2 | 7 | 550 | 2 | 4 | 1.45 | 10 | | | 8 1/2 | 1.00 |
| Mogul | 10 | 20 | 1 | 8 1/2 | 12 | 400 | 2 | 4 | 1.45 | 10 | | | 4 1/2 | .51 |
| Titan | 10 | 20 | 2 | 6 1/2 | 7 | 500 | 2 | 4 | 1.45 | 10 | | | 5 | .58 |
| Case | 10 | 20 | 4 | 4 1/2 | 6 | 860 | 3 | 4 | 2.13 | 10 | | | 7 1/2 | .58 |
| Case | 9 | 18 | 4 | 3 3/4 | 5 | 950 | 2 | 3 1/2 | 1.45 | 10 | | | 4 3/4 | .56 |
| Stinson | 18 | 36 | 4 | 4 3/4 | 6 | 1000 | 3 | 4 | 2.13 | 15 | | | 9 | .78 |
| Allis-Chalmers | 10 | 18 | 2 | 5 1/4 | 7 | 720 | 2 | 3 | 1.45 | 10 | | | 6 3/4 | .80 |
| Wallis Cub | 15 | 25 | 4 | 4 1/2 | 5 3/4 | 900 | 3 | 4 1/2 | 2.13 | | | | 6 1/4 | .80 |

We, the undersigned, certify that the above is a correct report of the Official Tractor Demonstration held at Minot, N. Dak., June 19, 1918.

G. D. COLCORD
G. A. HASSEL
M. R. PORTER } Committee

Official Figures - Not Mere Claims

Every farmer is entitled to the facts. The results of official tests made at two recent tractor demonstrations—the State Tractor Demonstration at Minot, N. D., June 19, 1918 and the National Tractor Demonstration at Salina, Kansas, July 29, 1918, are *official proof* of actual field performance. In each case these tests were made under the supervision of experienced, though impartial judges.

At State Demonstration

| | Average of 5 tractors—burning gasoline exclusively | Average of 23 tractors burning kerosene, or gasoline and kerosene | Rumely Oil-Pull 14-28 burning kerosene |
|----------------------------|--|---|--|
| Number of acres plowed | 2.02 | 1.84 | 2.27 |
| Fuel per acre (gallon) | 3.26 | 3.77 | 2.97 |
| Fuel cost per acre (cents) | 88.2 | 66.27 | 45 |

Note that the Rumely OilPull using kerosene

- used less fuel per acre than any competing tractor using kerosene, gasoline or both.
- plowed at the lowest cost per acre of all competing tractors.

Note the number of plows and depth of plowing. Ten so-called "3-plow tractors" pulled only two plows—eight tractors rated 14-27 to 24-36 H.P. pulled only three plows each.

- the Rumely OilPull pulled four plows—the number it is advertised to pull.
- it plowed 4 1/2 inches deep—the maximum depth—equaled by two competitors only.
- it was the only tractor burning kerosene that plowed 4 1/2 inches deep.

At National Demonstration

At the National Tractor Demonstration at Salina, Kansas, July 29th to August 3rd, the OilPull was entered in all official tests. No comparisons with other tractors can be made as results of tests were not made public by the officials. All tests were under the supervision of agricultural authorities. Following are the official figures for the 14-28 OilPull.

Drawbar Fuel Test

Soil—moist gumbo, stubble ground.

Number of plows—4.

Depth of plowing—6 inches.

Fuel used per acre (kerosene) 2.92 gallons.

(Note that fuel consumption per acre is almost identical with that of the OilPull at Minot.)

Drawbar H.P. Test

Soil—stubble, loose on top.

Average drawbar pull 15.7 h.p.

Maximum drawbar pull 17.3 h.p.

Showing a reserve power of 23 1/2% over advertised rating.

Belt H.P. Test

Average belt h.p. 35.01 h.p.

Showing a reserve power of 25% over advertised rating.

These successful and economical performances of the 14-28 are just a sample, *officially proved*, of every day work of the OilPull—in any size. Rumely OilPull Tractors have never burned anything but kerosene, or other fuel oils, and furthermore, every purchaser of an OilPull gets a *written guarantee*, signed by Company Officials, that his tractor will burn successfully all grades of kerosene, permitted by law to be sold in the United States and Canada, *under all conditions, at all loads* up to its rated brake horsepower.

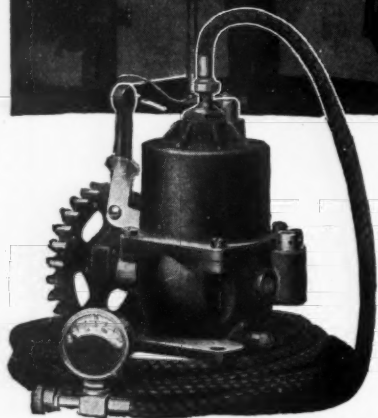
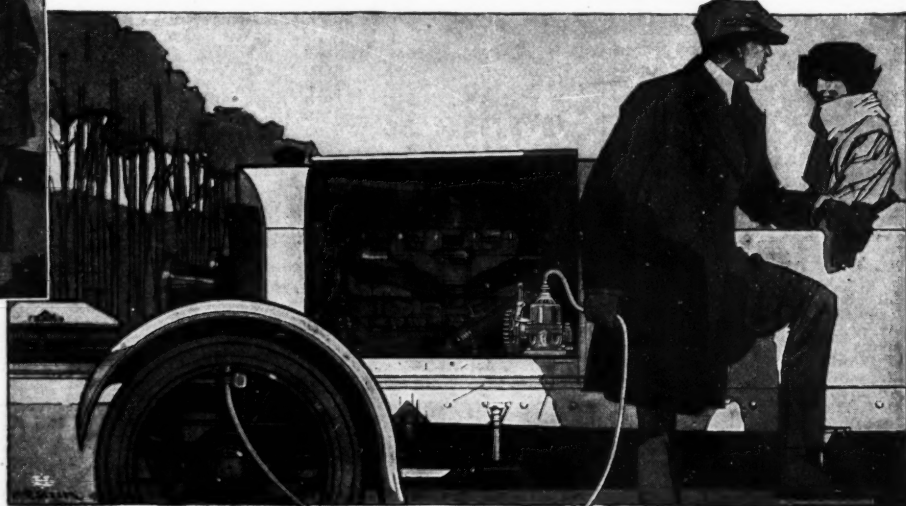
As the above figures prove, when you buy a Rumely OilPull you get what you pay for and expect, and then some extra—*guaranteed* economy and the *plus* power that makes the OilPull always "there" on the pinches.

The Figures Speak for Themselves. Which Make Tractor do You Want?

ADVANCE-RUMELY THRESHER CO., Inc., LAPORTE, INDIANA



When Writing to Advertisers, Please Mention Motor Age



With the Cassco Tire Pump you do none of the pumping—the engine does it all

Why break your back? *It costs money to do it*

Pumping tires by hand is such weary, tiresome work, you are very apt to leave the tires improperly inflated.

Soft tires are the cause of 80% of tire troubles, according to tire authorities. Properly inflated tires mean high mileage.

The Cassco Engine-Driven Tire Pump insures well-inflated tires. You can get 40% to 100% more mileage out of properly inflated tires. That is \$30 or \$40 a year. Half a season's mileage will pay for the pump and you avoid hard, dirty hand pumping.

Get a good pump

When you get a pump get a real one. The Cassco Pump will

inflate a 34x4 tire to 80 pounds pressure in 90 seconds. That's a pump!

Good markets for the dealer

Nine out of ten motorists are prospects for a Cassco. Every car driven by a woman should have this engine-driven pump. A splendid market exists among new drivers because they generally buy a good hand pump and the gauge. Get them to add a few dollars more and get a real pump. It includes one of the finest gauges made.

Cassco Pumps are on the good cars. The Cassco is one of the easiest accessories to sell because it gives so much real service. Less work and more mileage makes a strong appeal.

No oil spray

The Cassco is factory-built all through. That means better satisfaction than is possible from as-

sembled pumps. A special design of piston and cylinder prevents oil spray, so fatal to tires. Easy to install.

Sell by demonstration

The way to sell a Cassco is to show it. Put one on your own car. Show your customers how it works. Saving the motorist's back is a strong argument. Saving their tires—a stronger one.

Write today for full information. It's profitable.

Complete with all fittings including fine gauge. **\$15.00**
Powerful pump—easy to install

Special for Fords - - \$10.00
Complete with all fittings including fine gauge
Powerful pump—easy to install

Sales Department
EDWARD A. CASSIDY COMPANY, Inc.
Madison Avenue at 40th St., New York City
Manufacturers
THE WEST SIDE FOUNDRY CO.
Troy, N. Y.

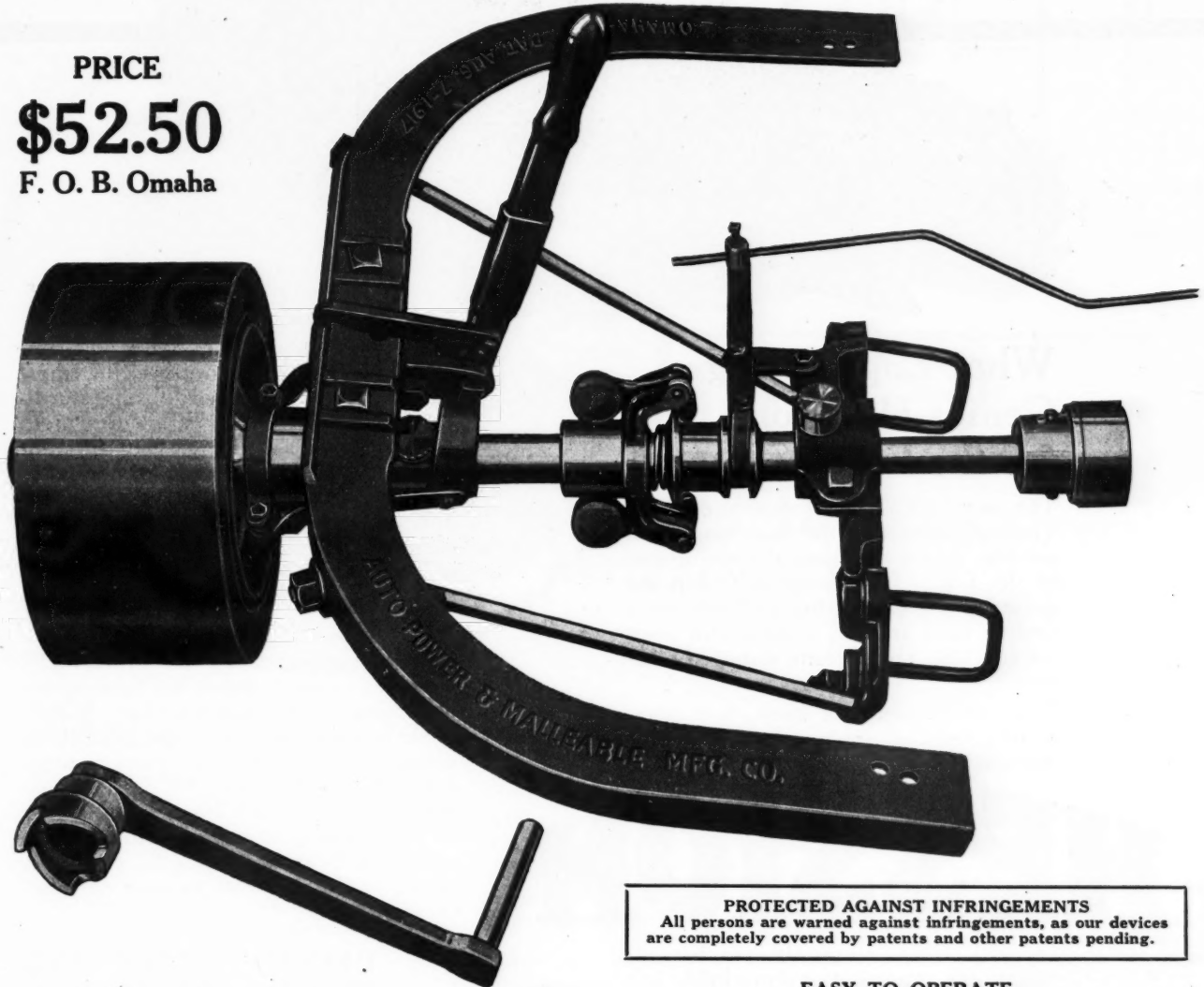
CASSCO TIRE PUMP

ENGINE DRIVEN

WIZARD AUTO POWER TRANSMITTER

A Power Attachment for Automobiles. Let your Auto do your Work

PRICE
\$52.50
F. O. B. Omaha



PROTECTED AGAINST INFRINGEMENTS
All persons are warned against infringements, as our devices are completely covered by patents and other patents pending.

EASY TO OPERATE

A belt is all you need to connect it with any piece of machinery. Simply drive your car within belt range of the machine you wish to run—line up the pulleys by driving your car in position. Stop your car, but not your engine. Put on the belt. Throw the clutch in pulley and speed and power are automatically regulated by the governor.

Easy to attach. Simple in construction. Nothing to get out of order. It positively will not injure or deface your car. Not as much wear on the engine as driving on the road.

NO STRAIN ON YOUR CAR

No holes to bore or changes to make on the car. No gears to get out of order. No wear on tires, axles or transmission. This is the most practical power plant on the market.

DEALERS ARE DOING A BIG BUSINESS ON THE WIZARD AUTO POWER TRANSMITTER

Every auto owner in your territory is a prospect. You can sell him on a single demonstration. We have some good open territory and a liberal contract. Write, telephone or come in to see us. You will have to act quick, as we are placing new agents every day.

RIGID, LIGHT CONSTRUCTION

Follow instructions and directions and this device will deliver horsepower to you where you want it, how you want it and whenever you want it. It will pull when the auto won't travel the road. Just think what you can do with a Ford engine and the Auto Power Transmitter. You can run the following machinery:

| | |
|------------------------|-----------------------|
| Corn Sheller, any size | Washing Machines |
| Feed Grinders | Pump Water |
| Ensilage Cutters | Fanning Mills |
| Buzz Saws | Churns |
| Hay Presses | Machine Shops |
| Elevators | Electric Light Plants |
| Cream Separators | Concrete Mixers |

In fact any piece of machinery run with a belt, from 1½ H. P. up to 16 H. P., at less than one-fifth the expense of operating any stationary gas engine on the market.

Read What Some of Our Owners Say About the WIZARD

A farmer living at Geneseo, Ill., writes: "I run a 10-inch Fairbanks-Morse Grinder with excellent results, running it to full capacity on new ear corn."

Charles Vandeman of Botna, Iowa, says he can shell 50 bushels of corn in 6 minutes. Same man says he has shelled 40,000 bushels of corn in last two months for neighbors.

Paul Rosburg, Hinton, Iowa, says: "I sawed wood with a 30-inch buzz-saw, sawing maple logs that had been cut three years; the Ford engine had power to spare."

Dr. S. Heilman, at Ida Grove, Iowa, says he filled a 16 by 40-foot silo one-half full in one day with a Ford car.

AUTO POWER & MALLEABLE MANUFACTURING COMPANY 729 First Nat'l Bank Building
OMAHA, NEBRASKA



What Engineering Genius Has Done for the Farmer

The new HESSION Farm and Road Tractor embodies, in one single assembly, every mechanical requirement of the farm. Concentrated within the solitary compass of this one unit are a tireless land tractor, a powerful road tractor, and an efficient stationary engine.

This achievement, in itself, is a noteworthy feat of engineering. But it is not all. The

HESSION

Tractor, from a purely mechanical standpoint, represents a remarkable advance in design and performance.

To find out how to make the most simply constructed, most powerful, most economical, lightest weight and sturdiest tractor in the world, we designed, produced and tested **eleven different models**. We studied, experimented—**worked**. And the new HESSION Farm and Road Tractor came into being, to give the farmer **for the first time** a positively efficient all-purpose tractor and power plant.

Now—who's going to get this dealership? If you don't sell HESSION Tractors, you'll have to face overwhelming competition—for **SOME ONE** is going to secure the HESSION agency in your territory. First bidders get first consideration. HESSION business can't wait—it's starting right now to find its way to every farming community in North America. So you can't afford to delay; write at once for particulars.

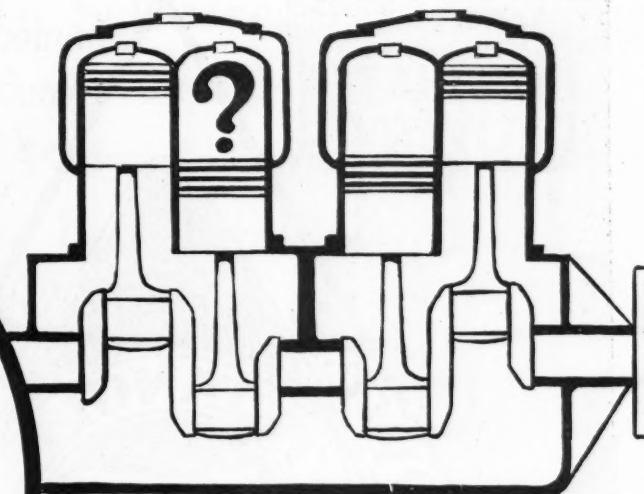
HESSION TILLER AND TRACTOR CORPORATION
27 JEWETT AV., BUFFALO, N. Y.

As a Road Tractor

By means of interchangeable road wheels, equipped with solid rubber tires, the Hession Farm Tractor becomes a smooth running Road Tractor. It will haul heavily loaded trailers for any distance at a speed of 10 miles an hour. Wheel changes made quickly and easily.



When Writing to Advertisers, Please Mention Motor Age



Have You a Slacker Cylinder?

Note These Special Advantages:

1. The sharp edge of its revolving shutter prevents the formation of carbon inside the valve and insures quick, easy, certain action—*always*. No "sticking" or slowing up.
2. The simplicity of construction—only 1 moving part—it is both indestructible and trouble-proof.
3. The scientific design is far in advance of old-style cut-out devices.
4. The wide, bell-shaped mouth and direct channel, assures a loud, clear, tone easily heard above other noises, and gives full relief from back-pressure.
5. Careful construction, quality material, no adjustments ever necessary. Self-contained, self-cared-for. Guaranteed for the life of the car.

LISTEN to "your motor's voice." It will tell you. And tell you *in time!*

The GOODRICH MOTOR TESTING VALVE is the "best little trouble-teller" you can buy. If there's anything wrong with your engine it will let you know it instantly and positively. It *never* "sticks," or works sluggishly, or stands half-open.

There are reasons why the GOODRICH MOTOR TESTING VALVE is guaranteed to remain in good order for the life of your car.

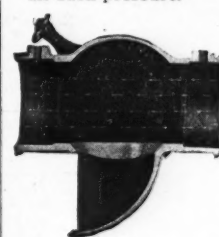
Made in All Sizes for All Makes of Cars

DEALERS: If you are not handling the GOODRICH MOTOR TESTING VALVE you are not getting your share of sales on this already famous cut-out, or cashing in on the demand created by our advertising. Hundreds of Dealers everywhere are enthusiastic over the Goodrich Proposition. Have us tell you why—write today!

A bisected valve—showing closed position. Note the knife edge of the revolving shutter. It prevents the formation of carbon inside the valve.



Open Position. The bell shaped mouth intensifies sound and relieves the engine of all back pressure.



GOODRICH-LENHART MFG. CO.

419 WIDENER BUILDING

PHILADELPHIA, PA.

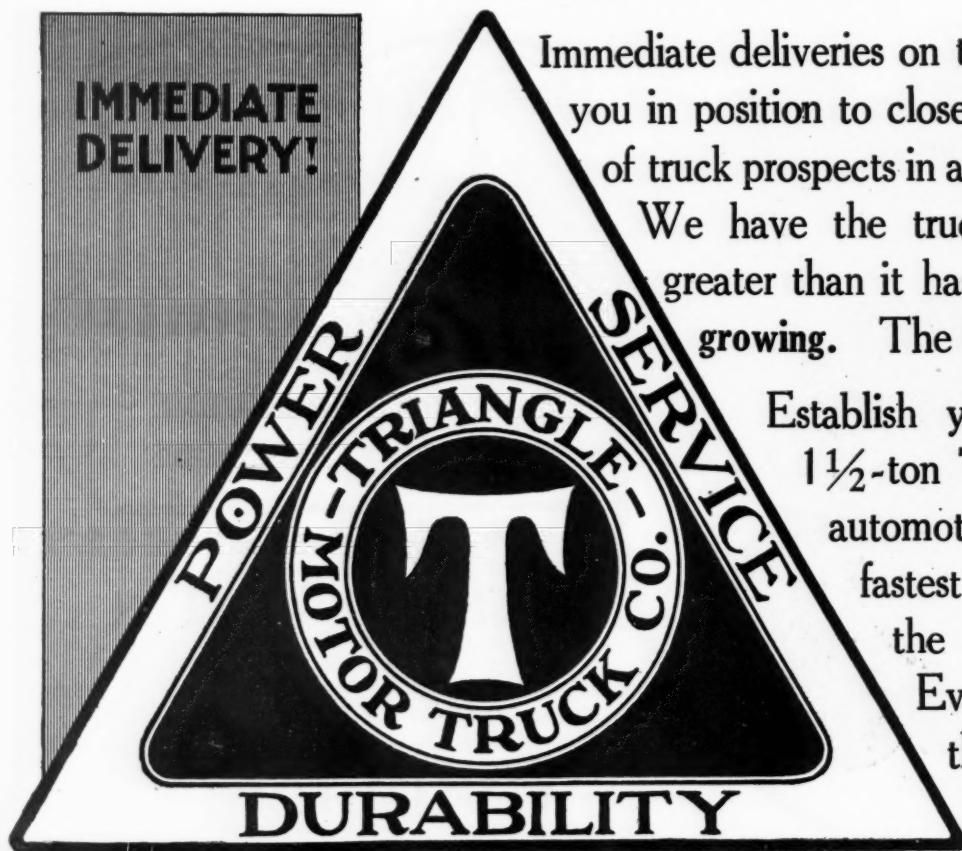
Members of the National Association of Automobile Accessory Jobbers

Goodrich

MOTOR TESTING VALVE

(replaces old style cutout)

**IMMEDIATE
DELIVERY!**



Immediate deliveries on this 1½ ton model put you in position to close with a big percentage of truck prospects in any locality. No delay. We have the trucks. The demand is greater than it has ever been—and it is growing. The market is wide-open.

Establish yourself now with the 1½-ton Triangle as a dealer in automotive transportation—the fastest developing branch of the motor car industry. Eventually you will handle the complete Triangle Line of 1½, 2½, 3½ and 5-ton models.

Deliveries on our new 2½-ton model begin Oct. 1.

Now is your opportunity—today. Wire, or write at once for complete information and unusually interesting dealers' proposition.

TRIANGLE MOTOR TRUCK CO.

St. Johns

Michigan

Eastern Representatives: Triangle Motor Sales Co., 381 Fourth Avenue, New York City

Specifications:

Waukesha Motor, Eisemann Magneto, Stromberg Carburetor, Fuller Transmission, Universal Drive Shaft, Celfor Internal Gear, Rear Axle, Torbensen Front Axle, Detroit Bronze-Bushed Springs, Gemmer Steering Gear.

Wheelbase, 144 inches—Turning radius 23 ft. 6 in.—Tread 56 inches—Clearance, front 9½ inches, rear 12¼ inches—Tires, front 34x3½, rear 34x6.



When Writing to Advertisers, Please Mention Motor Age

Why Do Dealers Continue to Sell Grease Containing Mined Graphite (3½ to 18 per cent Grit and Impurities) When 99.9% Pure Graphite in a Wonderful Grease Is Available?

Dr. E. G. Acheson Certainly Did a Great Work When He Manufactured Graphite Under 7500 Degrees Electric Heat and Later Developed Gredag, the Amazing Graphite Grease

We have asked, in the heading above, a most vital question.

Each dealer must answer for himself—realizing his duty to his customers, who expect sound counsel and good merchandise from him.

No dealer would knowingly offer an impure or injurious product to his trade. For his own good he would not.

Yet, mark this well, many dealers are unwittingly selling graphite greases containing mined graphite. Mined graphite contains impurities—rock and other substances not helpful to metal—to the extent of 3½ to 18 per cent.

Isn't today a good day to take an inventory of your stock of grease? What are you selling?

* * * *

Dr. Acheson knew the shortcomings of mined graphite. He set about to produce something better.

At last he discovered a carbonaceous substance, which when subjected to 7,500 degrees heat in an electrical furnace for 10 hours, produced 99.9% pure

graphite. The remaining 1/10 of one per cent was merely condensed gas absorbed in cooling.

Then he invented a wonderful formula for grease. He cooked the best ingredients slowly 8 to 10 hours, stirring constantly and testing repeatedly. The final result is a grease that melts only at extremely high temperatures. The cup grease, for example, melts only at 205

to 212 degrees, while other greases break down completely around 120 degrees. Imagine the difference if you can.

Next he combined his grease and his graphite, producing Gredag.

Gredag makes friends for a dealer, and, after all, there's the big secret to prosperity.

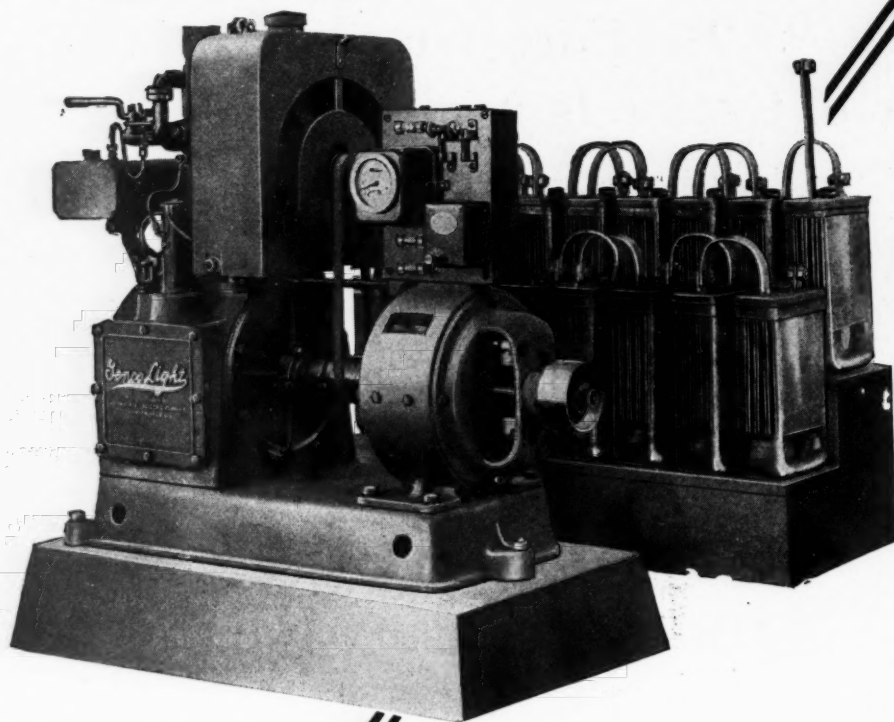
If you care to make some good money selling pure graphite grease speak now. Address Lubricant Department, Acheson Graphite Company, Niagara Falls, N. Y., the manufacturers of Gredag and sole makers of 99.9% pure, artificially produced graphite.

WORTH KNOWING

The only graphite grease which is not made from mined graphite is Gredag. The graphite used in Gredag is manufactured (not mined) in the great electrical furnaces at Niagara Falls, by a secret process discovered and patented by the eminent scientist, Dr. Edward G. Acheson. It is guaranteed 99.9% pure.

There is not a single iota of rock grit or other matter in Gredag which can harm the bearings on which it is used. It contains only pure, soft unctuous manufactured graphite ground down so fine that it can be blown through a screen with 40,000 openings to the square inch.

Genco Light



YOU Can Sell THIS PLANT

Consider These Features

Engine: High grade, vertical, 4-cycle, valve-in-head, counterbalanced crank, internal fly wheel.

Carburetor: Burns kerosene, gasoline or alcohol. Adjustable handle for easy starting and for different fuels. Fuel tank holds one gallon and is connected to carburetor with copper pipe.

Ignition: Special 32 volt type, distributor and coil.

Lubrication: Improved splash system of patented design. Oil gauge on crank case indicates oil level.

Cooling System: Cellular radiator, bolted to cylinder of engine; special adjustment to suit weather conditions.

Generator: Our own design specially constructed in our own factory. Gives high efficiency under rated load. Armature shaft supported by annular ball bearings.

Control Board: Bolted integral with generator; equipped with ampere hour meter — Bi-pole switch connects battery to plant. 2, 30 ampere fuses on house circuit, 5 amp. fuse on ignition circuit. All wiring at the rear completely enclosed and protected.

Starting Switch: Outfit is started by pressing button on control board. Special cutout stops engine automatically when battery is fully charged.

Battery: Our own special make, 16 sealed top glass jars — plates extra thick, insuring long life. Cells shipped fully charged.

Mechanical Power: Engine provided with pulley for driving machinery on line shaft direct. Engine delivery 2 H. P. for such work.

The sale of electric lighting plants for farm homes is the big thing these days in dealer sales.

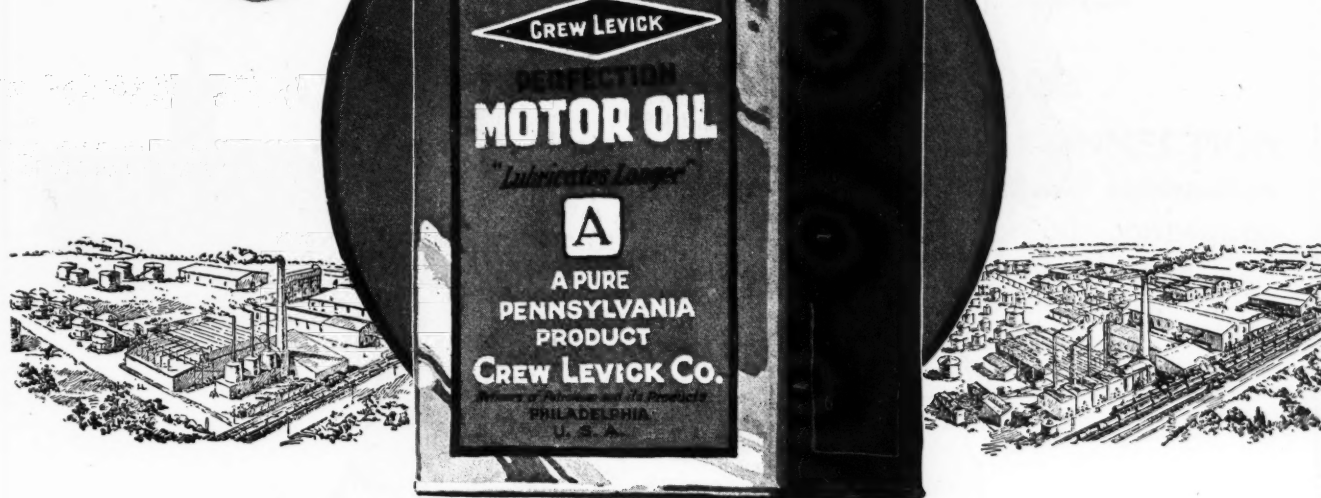
The sale of the Genco Light offers the brightest opportunity that has yet appeared in this field.

Up to now we have been unable to keep production on the Genco Light up with the demand, but since increasing our manufacturing facilities we are now able to take care of more dealers in various parts of the country.

If you are the liveliest wire in dealer work in your territory you should be interested in learning full details regarding our proposition for the sale of Genco Light. Write us today about it.

General Gas-Electric Company
Sixth and York Streets Hanover, Pennsylvania

QUALITY



A Better Motor Oil Available for All

NOT a new oil, but a brand used extensively in Pennsylvania for over half a century—made and used in the “Oil State,” where they naturally know a good oil and use it—is now available for all.

Crew-Levick Perfection Motor Oil is refined from pure Pennsylvania crude, the highest priced crude of today; therefore, its base is of the highest grade.

Crew-Levick Perfection

is first, last and always dependable. You can sell it with confidence that it will serve better. Your customers buy on a definite reputation built on more than half-century of making quality lubricants.

In Pennsylvania they speak of Crew-Levick “gas” and Crew-Levick Perfection Motor Oil just as purchasers of Government Bonds speak of their investments—absolutely dependable.

Take on the selling of this better oil today—we will be glad to write you our proposition or have a representative call and tell you about it.

Look into it Now while territory is open

CREW-LEVICK COMPANY, 117 North Broad Street, Philadelphia, Pa.

SUBSIDIARY CITIES SERVICE CO.

Branches: New York Chicago San Francisco Baltimore Boston

ESTABLISHED IN 1862

CREW LEVICK

“as old as the industry”

When Writing to Advertisers, Please Mention Motor Age

IMPORTANT INFORMATION for Jobbers and Dealers

Patents issued April 13, 1917
cover Broadly Auxiliary Radius
Rods for Ford Cars

We have exclusive rights under the Knudsen Patent which covers V type Auxiliary Radius Rods. Already several large manufacturers discontinued making these rods and suits are pending against others. We are prepared to furnish five styles of these rods and our large manufacturing facilities insure prompt deliveries in large quantities.

All Walker Rods are plainly marked with our name and patent date which protect the trade from purchasing infringing articles.



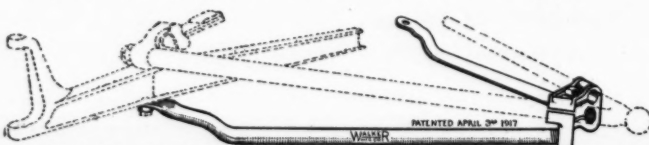
No. 701—Made of solid $\frac{3}{4}$ -inch steel rods. Malleable Clamp. Weight 12 pounds.



No. 702—Made of 1-inch x 1-inch x $\frac{3}{16}$ -inch Angle Iron. Weight 8 pounds.



No. 703—Made of 1-inch x $\frac{1}{2}$ -inch Angle Iron. Jointed Arms. Weight 5 pounds.



No. 704—Made of $\frac{1}{2}$ -inch Tubing. Malleable threaded clamp. Weight 9 pounds.

WALKER

Auxiliary Radius Rods For Fords

PATENTED

PATENTED

Great Dealer's Proposition—Big Demand—Good Profits. Be sure to get Walker Patented Rods. Stocked by most Jobbers. Don't buy Infringements. Walker Auxiliary Radius Rods are for reinforcing the regular Ford Radius Rod. They assist to brace the front axle, keep it straight, prevent bending or breakage of regular rod. Can be attached without drilling holes—simply clamp on to rear of regular rod and fasten to axle, using regular Ford Perch Bolt, except No. 701, which clamps to front axle.

WALKER MFG. CO.

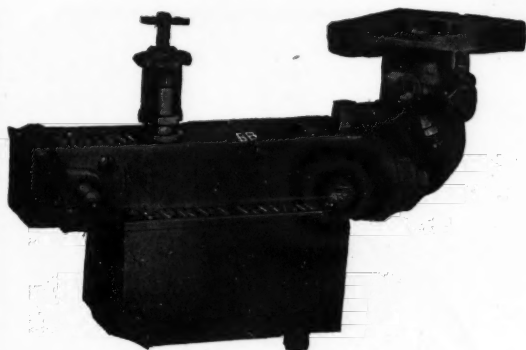
32 Hamilton Street

RACINE

WISCONSIN

When Writing to Advertisers, Please Mention Motor Age

SUNDERMAN



MODEL BB

\$ 8 WITHOUT CONNECTION
 \$10 with regular connection
 \$12 with special connection

Model F—Special for Ford, - **\$ 6**
 Metz and Saxon Four - - -

F. O. B. Newburgh

Save Your Share With a Sunderman

Efficient Carburetion Is Today's Great Necessity

The Nation demands gasoline saving. So keen is the need for conservation that Sunday motoring east of the Mississippi is frowned upon. New York and suburban roads looked like a deserted village Sunday.

**Saves from
30 to 50% of
Gasoline on
Any Car—
More on
Some Cars**

That proved two things: First, the essential part of modern life that the automobile fills. Second, the patriotism of the motoring public, which does not need the compulsion of law to respond to the nation's needs.

The Sunderman Carburetor comes into its own in times like these—because it *saves*. It saves surely, under all conditions of road, load, atmosphere or altitude.

It Saves Because of Its Mixing Principle

Briefly, the gasoline entering a Sunderman Carburetor is broken up so finely as to release the great amount of power usually lost in the ordinary mixture. Consequently, more power is gotten from a given amount of gasoline, and it takes less to operate a car with a Sunderman mixture. Thousands of testimonial letters are our authority for the statement that a Sunderman saves from 30 to 50% of gasoline on any car.

**Saves Gasoline without
sacrificing
power, speed
or flexibility
—prove it
yourself.**

Car Owners

You can do your patriotic *best*—not your *bit*—with a Sunderman Carburetor. Ask your dealer for it to-day. If he does not have it, write us and give the name and model of your car.

Dealers

The length of life of this industry is up to you. Stiffen your backbone and keep things going. Get this Sunderman proposition—it will help your business—and at the same time show you a real profit.

Manufacturers

National necessity, your own self-interest and the industry's need all demand that you at least demonstrate for yourself what a Sunderman Carburetor will do on your car, truck or tractor. We *want* to co-operate with you—simply ask us.

Sunderman Corporation,

11 Chambers St., Newburgh, N. Y.

PACIFIC COAST BRANCH: 593 MARKET ST., SAN FRANCISCO, CAL.

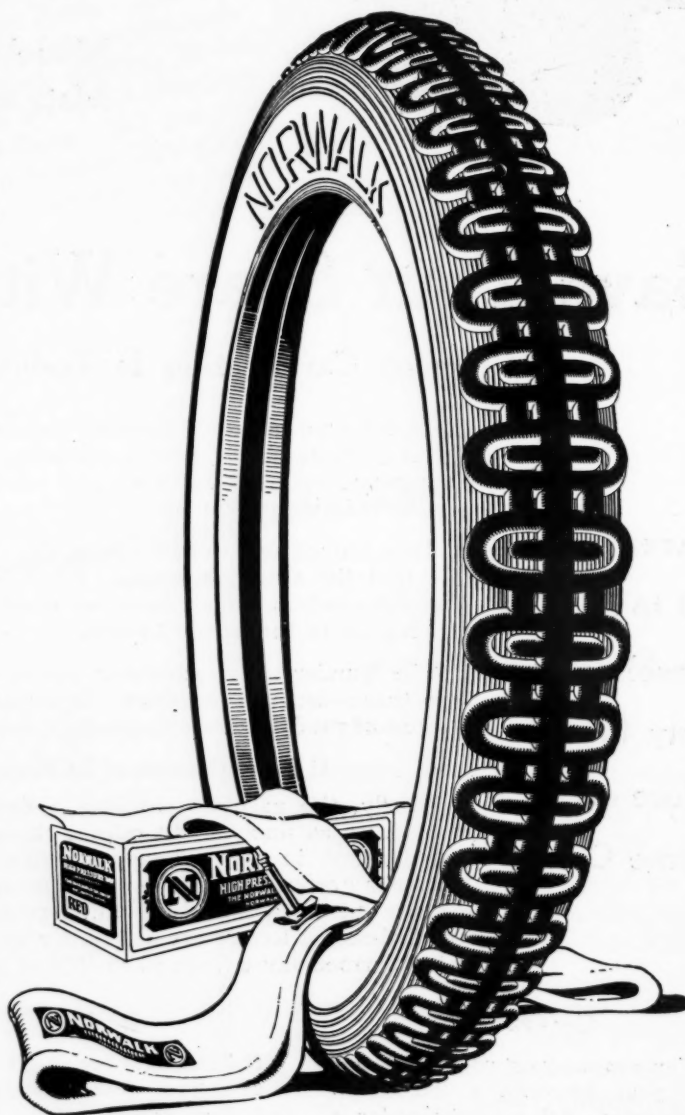
NORWALK

No Middle Ground

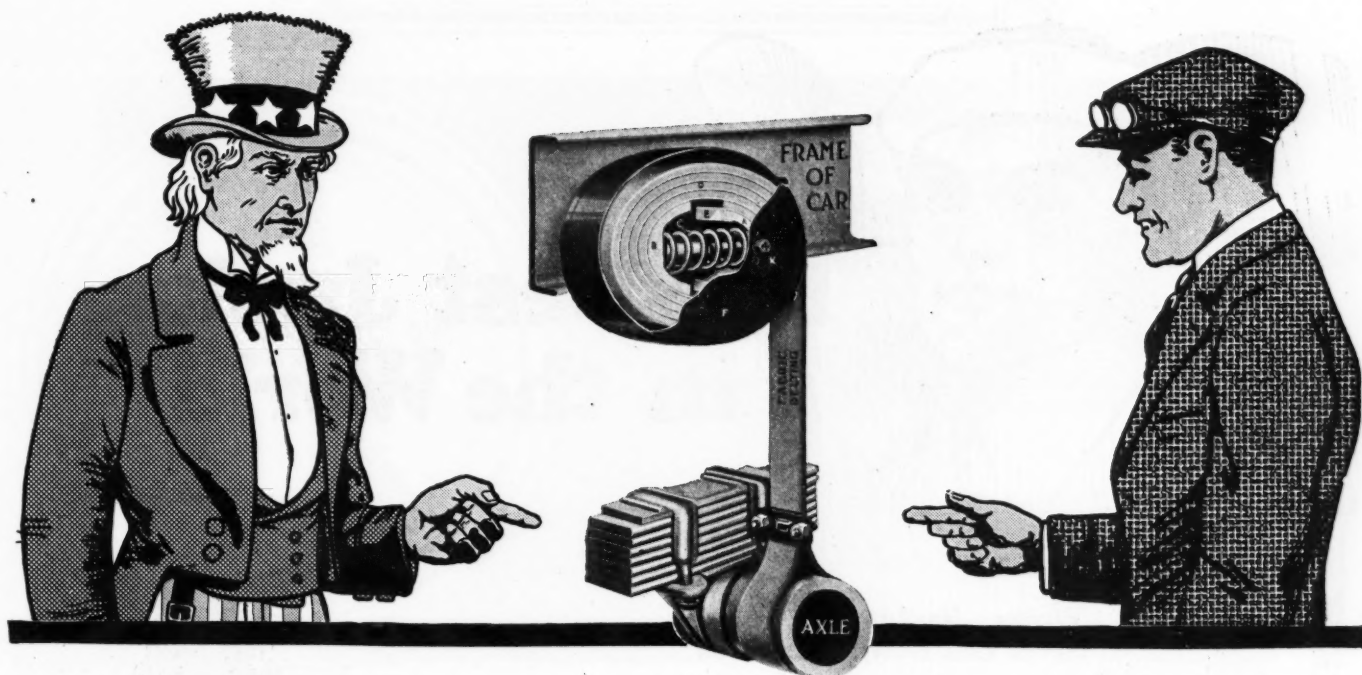
A man's simply got to have elbow-room when he's handling *Norwalk High Pressure Casings and Tubes*. He's got to have a clientele that's big enough to reach around the Norwalk. He's got to have enough customers to last until that first customer drives the old shoe down to the fabric—and comes back. Then he's off again.

That's why you want to have your whole territory as your market. We'll give it to you today, 100% airtight (like the Norwalk Tube), if the opportunity is still there. We'll know when we see the postmark on your letter—you're either inside or out. There's no middle ground with the Norwalk. Write us today.

NORWALK TIRE & RUBBER CO.
NORWALK, CONN.



HIGH PRESSURE
CASINGS AND TUBES

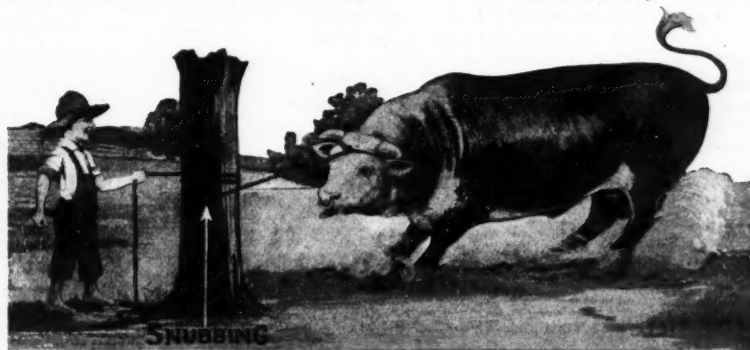


Every cut in motor car production is a warning from Uncle Sam to save your car with Gabriel Snubbers—the recognized standard equipment for making cars ride easier and last longer.

*Standard Factory Equipment
on America's Foremost Cars*

Send for literature and name of our nearest Dealer

GABRIEL MFG. COMPANY
1415 East 40th Street Cleveland, Ohio



GABRIEL SNUBBERS

When Writing to Advertisers, Please Mention Motor Age



The Best Jack in the World

**Works Easily and Surely
Never Lies Down on the Job**

Uncle Sam has a confidence in his boys that is born of an unbroken record of success.

They have the stuff—the stamina—the strength; and when we see these white-topped laddie-bucks strolling about on leave these days there's a little thrill of pride in the thought that they are "the best Jacks in the world."

Peteler AUTO JACK

Peteler Auto Jack earned the same title—"the best Jack in the world"—in the same manner. Since the first Peteler Jack was offered the trade it has never met a reverse—and the new model Peteler Jack introduced this year proved to us, after the most exhaustive tests, its all-around masterful quality and utility.

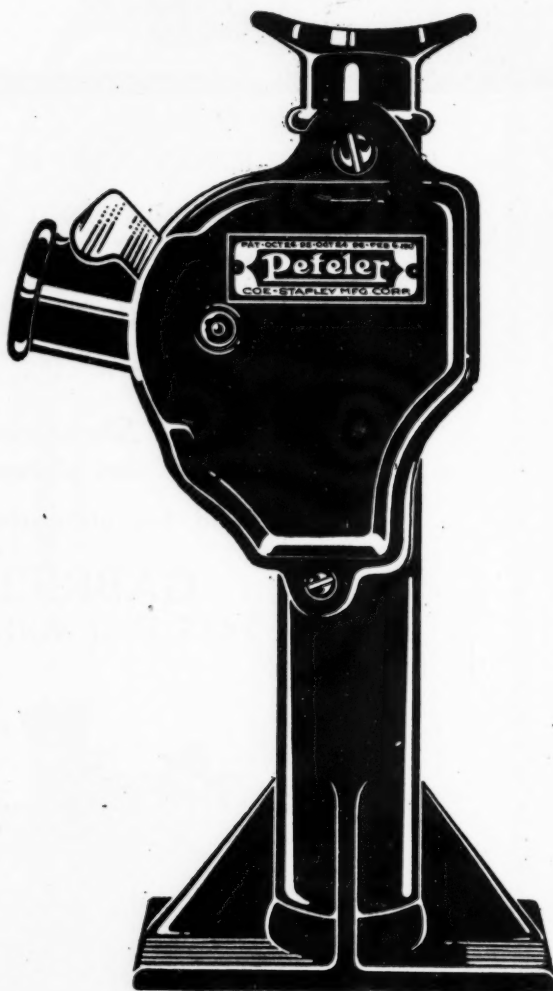
There is no danger line to a Peteler. Rated at 3000 pounds lifting capacity, it has a sure-lifting, rugged strength that is far beyond the demands of passenger car or light-truck service.

**A Splendid Proposition for Jobbers and Dealers
Write for It**

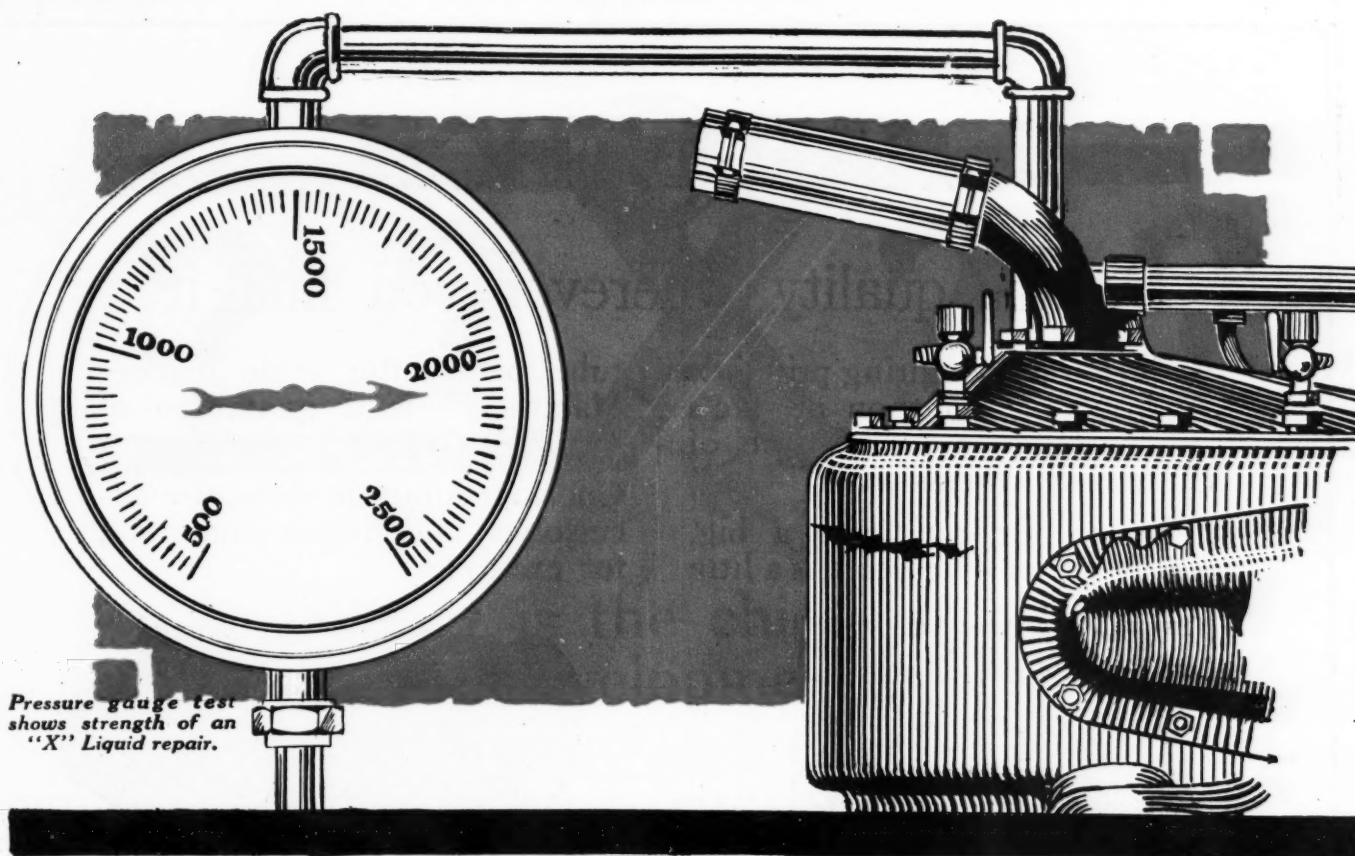
Coe Stapley Mfg. Corporation

Factories: Bridgeport, Conn.

Executive Offices: 135 Broadway, New York



COE-STAPLEY



An "X" Liquid Repair in a Cracked Cylinder Stands 2000 Pounds Pressure

EVERYBODY has met the "know-it-all" type of man. When you tell him something extraordinary he's sure to say "it can't be done."

We don't expect that *this* kind of car owner will believe that "X" Liquid has repaired a *cracked cylinder wall* making it as good as new—and saving the car owner over \$150 in repairs!

Yet the facts are on record—and can be verified.

It is no unusual thing for "X" Liquid to repair cracks in, valve pockets—in waterjackets—in parts of the cooling system where for any reason welding isn't *practical*—or *economical*.

And as for small holes in the radiator, pump, connections, etc.—"X" will repair *one* leak or a *thousand*—in *ten minutes*. And do a *better* job than can be had for \$25 worth of soldering.

"X" Liquid is the *only practical, scientific method of repairing leaks without danger to the cooling system*. It doesn't weaken the radiator as soldering does; nor does it choke the cooling system and make the cure worse than the *disease*—as is the case with radiator cements, flaxseed meals and such "dopes".

MANY car owners use "X" Liquid to reduce their upkeep costs. They keep "X" *constantly* in the water—and make their cooling systems **LEAKPROOF—RUST-PROOF—SCALEPROOF**.

It's not going to be easy to get another car next year—so *give your present car the care it deserves*. Always keep "X" Liquid in the water. One can last a season—and takes all the trouble out of the cooling system.

Every statement made about "X" Liquid is a **FACT**—not a claim—and can be proved by any car owner on the basis of our guarantee that "X" makes *100% good*—or your money back.

Get "X" Liquid from your dealer—or we will ship direct on receipt of price and dealer's name.

How "X" Works

"X" is a Liquid. When poured into the radiator it *instantly* combines with the water, circulates freely, locates every leak or crack and flows through. When it strikes the oxygen in the air the "X" is quickly solidified to a metal-like substance—*right in the hole*. The heat of the water then hardens this repair—making it absolutely permanent. It can't be loosened by the roughest road vibration.

In using "X" Liquid it is not necessary to drain the radiator—or search for the leak. "X" works automatically. If left in the water it repairs all *new* leaks the instant they appear—and *before* they give trouble.

The chemical composition of "X" is such that it cleans out the rust and scale that is present in every cooling system. By absorbing all free oxygen in the water "X" prevents *new* rust or scale from forming.

What "X" Does

- 1—Repairs all leaks *permanently*.
- 2—Prevents *new* leaks—keeps the cooling system **LEAKPROOF**.
- 3—Cleans out Rust and Scale.
- 4—Prevents *new* Rust and Scale—keeps cooling system **RUST-PROOF and SCALEPROOF**.
- 5—Keeps the engine cooler.
- 6—Saves oil and gasoline.
- 7—Guaranteed to make good or your money back.

Large Size, \$1.50 Ford Size, 75c

"X" LABORATORIES, 636 Washington Street, BOSTON, MASS.

Pacific Coast Branch: 433 Rialto Bldg., San Francisco, Cal.

MARATHON

Means quality wherever you find it

THE manufacturing principle back of Marathon products applies all along the line of everything we make.

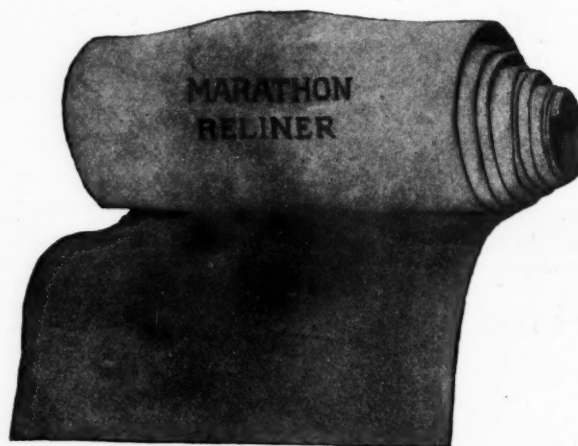
Whether the article is a big, sturdy tire or whether it is a litte

tube patch, the trade mark—Marathon—is a guarantee of quality to you.

Consider some of these tire accessories and repair materials, for example:



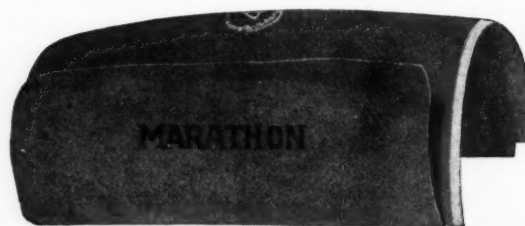
These self-cementing tube patches are made in two styles: the feather-edge, moulded patch; and the "stick-tite," a die-cut grey patch. The same material used in the die-cut patch is also supplied in sheet form.



These Re-liners are full moulded, press-cured, feather-edge and very strong; exactly the correct shape and contour to fit the inside of casing. You will find them to give excellent results.



Here is a Lace-On-Boot designed for large or severe casing ruptures. It is used externally, usually in connection with the rim-grip inside patch.

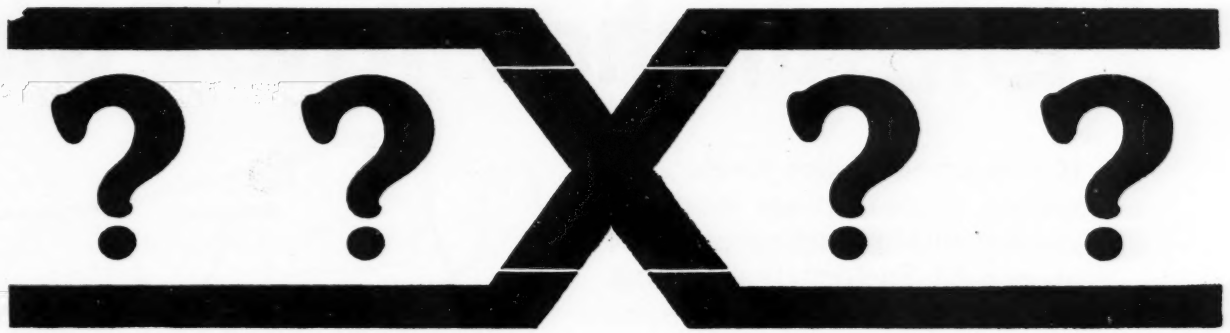


The Marathon "Rim Grip" Blow-Out Patch is made in the rim-grip style for universal use. It is moulded and press-cured; large, strong and feather-edged so as not to injure the tube.

MARATHON repair materials are gaining in popularity every day. Dealers, repairmen and jobbers will be interested in our prices on these and our complete line of repair accessories. Write.

THE MARATHON TIRE AND RUBBER COMPANY
Cuyahoga Falls, Ohio

Canadian Factory, St. Catharines, Ontario



What is the chief obstacle to the development of greater economy in the operation of a motor truck?

Does this obstacle also interfere with the general efficiency of the truck?

What is this obstacle costing truck owners annually?

Watch this page next month for further information.



22 Branches Are Convenient

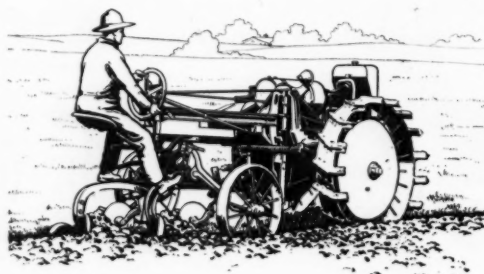
If you are a Moline Dealer—no matter where you are located—you are within short range of one of our 22 Factory Distributing Branches.

These branches have been established to give you and your customers prompt and efficient service.

These branches deal direct with Moline Dealers. In its territory each Moline Branch is equipped to give the same service that you could expect from the factory.

Every Moline Factory Distributing Branch carries a complete assortment of tractor parts on hand at all times.

Moline Dealers and users of Moline-Universal Tractors and Tractor Implements thus receive the speediest possible parts service. As a Moline Dealer you will recognize service of this kind as one of the most effective sales arguments.



MOL

UNIVERSAL

MOLINE PLOW

Factory and General Offices

Direct Factory

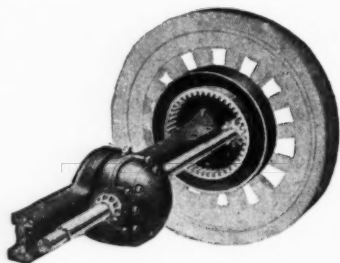
| | | |
|---------------------|-----------------------|----------------------|
| Spokane, Wash. | Salt Lake City, Utah. | Omaha, Neb. |
| Los Angeles, Calif. | Denver, Colo. | Oklahoma City, Okla. |
| Stockton, Calif. | Minot, N. D. | Dallas, Texas |
| | Sioux Falls, S. D. | Minneapolis, Minn. |

Convenient location of branch houses permits dealers to carry small

Why Does Republic Build the Most Trucks?

Last year Republic produced and sold more than twice as many motor trucks as were produced and sold by the next largest maker.

How was this leadership achieved so quickly? Why does Republic build the most trucks?



The Internal Gear Drive used on all Republic Trucks, delivers 92% of the motor power to the wheels. We know of no other form of drive that delivers as much.

Simply because the quality that has been built into all Republic Trucks and the service they have given to their owners created an endless chain of demand for more trucks of the same dependable kind. And the Republic factories grew to meet the demand.

These are the reasons for Republic leadership and for the success of Republic dealers.

7 Models—3/4 ton to 5 ton

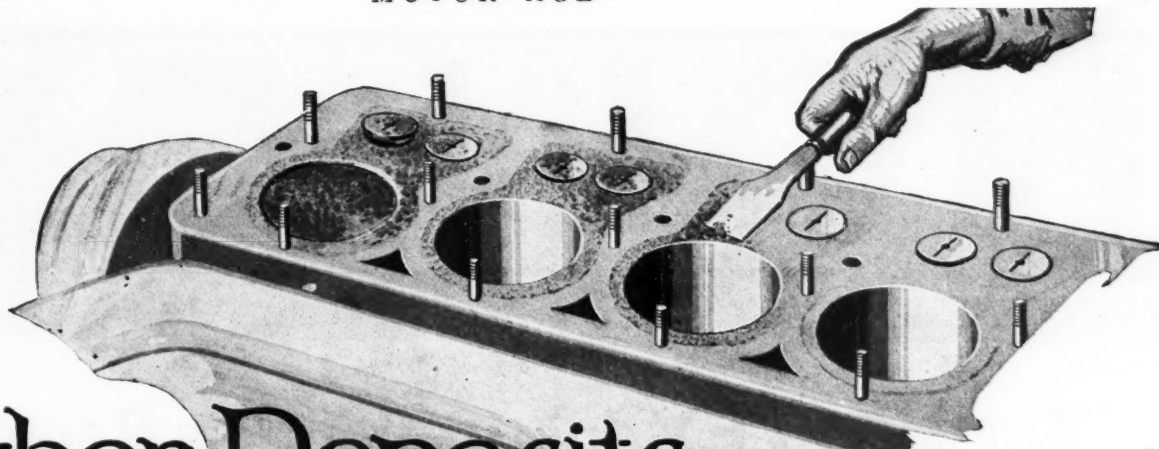
REPUBLIC MOTOR TRUCK CO., INC.
ALMA, MICHIGAN

REPUBLIC

Internal Gear Drive

MOTOR TRUCKS

Built by the Largest Manufacturers of Motor Trucks in the World



Carbon Deposits show Wasted Gasoline

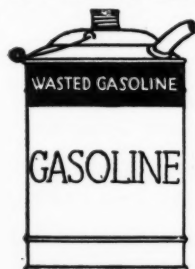
THE formation of carbon in your motor is a sure sign of wasted gasoline. For carbon is nothing more than gasoline that has failed to ignite. A portion of this heavy unburned residue goes out through the exhaust as smoke, another portion adheres to pistons, cylinders, spark plugs and valves, forming carbon. Some may leak past the piston rings, thinning the lubricating oil in the crankcase.

Indeed, carbon deposits mean a double waste. You actually pay to have removed from your motor, in the form of carbon, elements that should have developed power to propel your motor.

Producing Power from Carbon-Forming Elements

To reduce the formation of carbon and its resulting disadvantages, you must have more perfect combustion in your motor.

With the heavy grade of gasoline now on the market it has been a most difficult task to produce perfect combustion—until ECCOLENE was formulated. Through its use more perfect combustion is obtained and the carbon-forming elements are converted into power.



This picture shows the proportion of fuel that is wasted when using plain gasoline. It is wasted by not being burned, and a badly carbonized motor is the result.



This 5 gallon can holds 25 per cent less than the one above. By adding 1-3 of the contents of this small 3-ounce bottle of ECCOLENE it will give the same or even more mileage.

The Action of ECCOLENE

ECCOLENE, through a complex process termed decolorization, makes gasoline vapor more thoroughly combustible under compression in the motor cylinders. By decolorizing the gasoline vapor ECCOLENE transforms a large proportion of the carbon-forming elements; at the same time it assists the process of lubrication.

Thus, when ECCOLENE is added to gasoline in proper proportion, a vapor is produced that leaves no waste—no residue—practically every atom of the gasoline is burned. And the elements in the fuel that would ordinarily be wasted are converted

into power for driving your car. You will find little or no carbon on spark plugs, valves, etc. Moreover, ECCOLENE produces such complete combustion that its use gradually causes carbon deposits to disappear, which, in itself, is proof that these deposits are simply unburned fuel.



RALPH DEPALMA Says:

"It is my sincere belief that the use of ECCOLENE will be a great boon to motor drivers. I have experimented with it in nearly all types and sizes of motors. * * I have also used it in some of my racing cars.

"The results have always been the same—freedom from carbon—clean spark plugs—greater acceleration—motor

performance better in every way, and with the carburetor properly adjusted there is a worth-while saving in gasoline."

Detroit, Mich., July 18th, 1918.

"I have used ECCOLENE for several months, and it gave me genuine pleasure to find it producing all of the claims made by its manufacturer.

"I find that in both small and large motors, that the acceleration is improved—that carbon is kept down to minimum—and that gasoline saving is most apparent."

Very truly yours,

Harrison Boyce, Boyce Motor Meter.

New York City, August 7th, 1918.

"I am pleasantly surprised at the results I have secured from your ECCOLENE. I have made four tests with my Hudson Sedan on ECCOLENE and have gotten an average of a little over 15 miles per gallon of gasoline with the few ounces of ECCOLENE you prescribed."

Yours very truly,

Leo Greendlinger, Alexander Hamilton Institute.

Chicago, Ill., July 27th, 1918.

"This is to advise you that, in the Uniontown races of July 18th, I used your ECCOLENE in my Frontenac car, in which I won the Sweepstakes, breaking the track record and making the best time which has ever been made on the Speedway."

Yours very truly,

Louis Chevrolet.

Lawrenceville, Vir., July 25th, 1918.

"I am trying ECCOLENE on Hup 1917 N., and so far it is doing all you claim for it. The motor seems to be fond of ECCOLENE, for I find that instead of the usual sixteen miles to the gallon, I am getting twenty, and on proper adjustment I am looking for more."

Yours very truly,

Edw. R. Turnbull, Jr., Turnbull & Turnbull.

Gasoline Economy

Just as ECCOLENE reduces carbon it also saves gasoline by giving more perfect combustion. It enables you to get more miles from your gasoline. It increases power—reduces overheating—lessens smoke and noise and produces better acceleration.

Not An Explosive

ECCOLENE is positively non-volatile, and should be compared in no way to picric acid or ether—two highly powerful volatiles which render gasoline much more explosive and are also harmful and dangerous to use. ECCOLENE is positively non-injurious to any metal. Test ECCOLENE with litmus paper, and prove for yourself that it contains not even a trace of acid.

Results Are Guaranteed

We positively guarantee that ECCOLENE will give you a better performing motor—reduce carbon troubles and save gasoline. We guarantee the increase in economy to be at least 25%. ECCOLENE is sold on a "money-back" guarantee basis.

Sales Prospects

To the live up-to-date dealer who takes advantage of the opportunity offered through the sale of Eccolene, there is the prospect of a huge repeat business. There are over five million motor cars as well as millions of motor boats, tractors, stationary engines, etc., that will continually use ECCOLENE. Make your establishment headquarters for ECCOLENE, and send for sales-getting advertising material, which we will be glad to send you.



Prices
1 Quart \$2.00
1 Gallon 7.00

For the convenience of truck fleet owners, ECCOLENE is also put up in five-gallon cans.

Sales Department
EDWARD A. CASSIDY CO., Inc.
Madison Ave. at 40th St.
NEW YORK CITY

THE ECCOLENE COMPANY
Manufacturers
DETROIT, MICHIGAN

The Eccolene Co.
Detroit, Mich.

Enclosed find \$_____

for the _____

size can of ECCOLENE.
Money to be refunded if I am
not entirely satisfied with results.

Name _____
Address _____

HOLLEY

The HOLLEY Institution - Its Record

FOR SEVENTEEN YEARS the name Holley has been identified with improvement in motor fuel carburetion. During those years the Holley organization made 2,000,000 carburetors as standard equipment for Ford cars alone—it became the largest maker of carburetors in the world. The Holley Company is making possible the commercial use of kerosene, benzol, distillate and alcohol as motor fuels, conserving the supply and cutting the cost of motor operation through the development of carburetion devices for these heavier fuels. Three of the world's largest tractor manufacturers now install Holley Motor Products as standard equipment—Henry Ford and Son from the very first. The British Government specifies the Holley All-Fuel Carburetor on two tractor models. Altogether, more than 24,000 Holley All-Fuel Carburetors are operating successfully with kerosene on trucks, tractors and passenger cars—more than 5,000 on passenger cars alone. The Holley Air Washer, another Holley Motor Product, is standard equipment on the Fordson Tractor.

MOTOR PRODUCTS
FOR TRUCKS TRACTORS AND AUTOMOBILES

HOLLEY

The HOLLEY Manifold

(For Fords, Maxwells, Overlands)

**Saves 45 Cents to \$1.00
Every Time You Fill the Tank**

DID you ever on a cold morning pour hot water on the intake manifold of your motor?

The heat helped to vaporize the cold gasoline.

The same principle is applied by the Holley Manifold, which employs exhaust heat to properly vaporize the fuel.

In the good old days of high gravity gasoline almost any kind of carburetor would vaporize the fuel you were using.

But the low gravity of fuels today has made it necessary to apply heat for the complete vaporization of even gasoline.

In a cold manifold drops of liquid fuel tend to collect at the bend near the carburetor, and it is at this point, as well as throughout the length of the intake, that the Holley applies heat and thus completely vaporizes every drop of fuel.

By means of the valve at "E," as shown in the illustration, the flow of exhaust through the manifold may be regulated as desired.

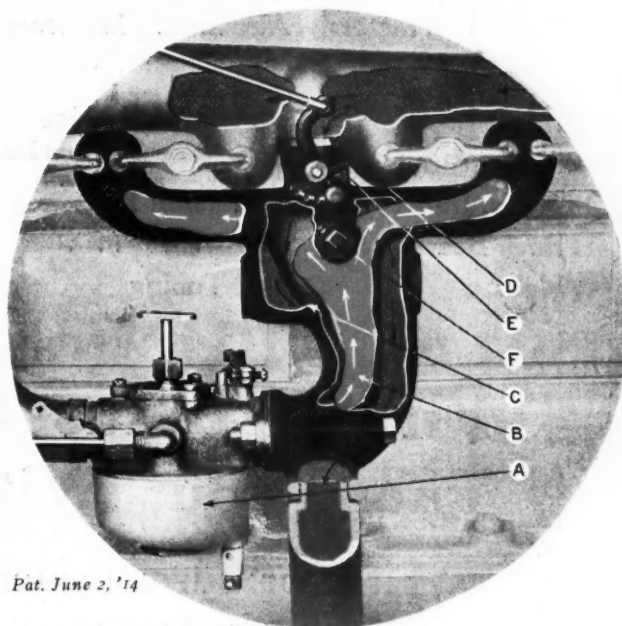
Regulation of exhaust heat is as important as the principle through which the Holley brings about complete vaporization.

With the Holley Manifold you can save 45c to \$1.00 every time you fill the tank—even more where distillate is used.

You can get 5 to 8 more miles per gallon of fuel.

You can get better operation—smooth running, perfect ignition, and freedom from motor troubles which result from poor carburetion.

Talk to your service man or supply dealer about the advantages of the Holley Manifold.



Pat. June 2, '14

Holley Manifold On a Ford Car

A Regular Holley Carburetor D Exhaust Opening
B Intake Passage E Heat Control Valve
C Exhaust Enveloping Jacket F Tapped Hole for Primer

An Unusual Dealer Opportunity

We want dealers who are desirous of building up a permanent business through the sale of Holley Motor Products. We will consider an arrangement through which you may handle the sale of our products if you are well established and territory in your locality has not been allotted. Write for further particulars.

Price: Ford, \$9.50; Maxwell, \$10.00; Overland, \$11.50

Holley Carburetor Company

Factories: Detroit, Michigan, and Coventry, England

(8)

MOTOR PRODUCTS

FOR TRUCKS TRACTORS AND AUTOMOBILES

STANDARD PARTS

Standard Parts for Motor Cars, Trucks, Tractors, Airplanes, Motorcycle and Other Vehicles

Axles

Axles (dead rear)

Axles, trailer

Bock Bearings

Hubs

Perfection Springs

(regular and thin leaf)

Perfection Heaters

Stanweld Rims

and Tubing

Other Stanweld Products

Rims—clincher detachable and demountable for single and dual equipment

Clincher Rims

Detachable Rims for Wire Wheels, special

Millimeter Rims, all types

Rim Tools

Flanges and Fittings Solid Tire Demountable Equipment

Tire Bases in Demountable and Pressed on Channels

Brake Rod Assemblies, complete

Starting Cranks

Electric Welding of Parts

Exhaust Tubes

Bands S. A. E.

Formed Tubing

Forging for Convertible Trucks

Ignition Wiring Tubes

Lamp Brackets

Mast Sleeves

Oil Tubes

Radiator Rods

Starting Gear Rings and Boxes

Straight Steel Tubing

Steering Gear Tubing

Tail Pipes

Torsion Tubes

Truss Rods

Tubing (straight and formed)

First Comes the Government Then You, With All Our Might!

First for our consideration comes the Government's needs.

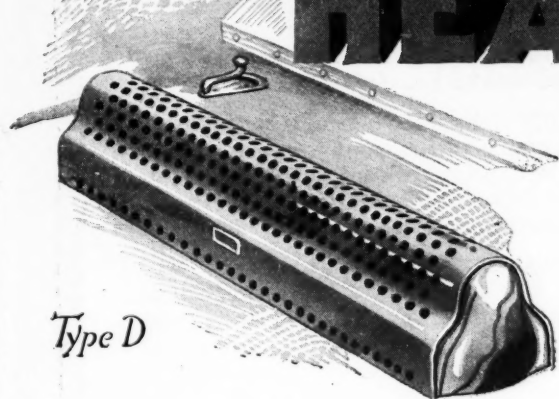
Our attitude in this matter is *your* attitude—in proportion as you help us serve the government, *you* are serving it.

By doubling and redoubling our efforts and by utilizing our vast facilities and resources to the utmost, we are straining to take care of trade needs.

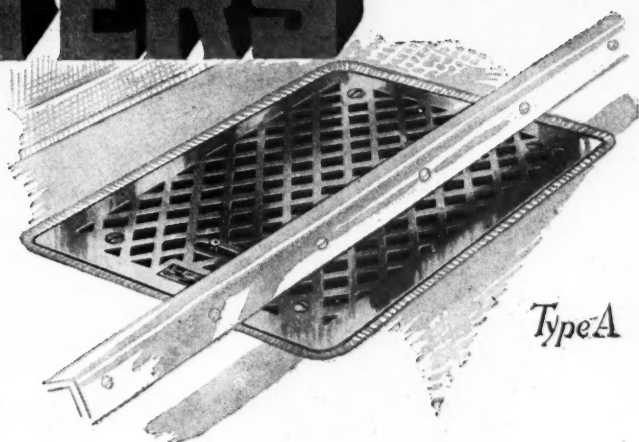
Working together in this spirit we shall jointly aid our country and protect our mutual trade interests.

The Standard Parts Company, Executive Offices, Cleveland, Ohio

PERFECTION MOTOR-CAR HEATERS



Type D



Type A

Exceptional Opportunity for Perfection Heaters—Order at Once

Existing motor cars will be more generally used this fall and winter than ever before.

Transportation conditions require the use of *more* cars, more continuously.

Garage installation of Perfection Heaters will be exceptionally large, with dealers looking to the Jobbing Trade for supplies.

The increase of 300 percent in the sales of Perfection Heaters for motor cars indicates the thriving condition in this business.

It is wisdom to order now and avoid delays or disappointments possible because of shipping conditions that may become more difficult as winter approaches.

The Standard Parts Company, Perfection Heater Division, Cleveland, Ohio



Delivered

That's the notation a Moon Dealer puts beside a purchaser's name a few days after he has sold a car—Delivered. And that's just what is indelibly impressed upon the mind of the purchaser after he has used the car—it has delivered.

We can assure prompt deliveries because of the location of the Moon factory in St. Louis, where we are outside the congested freight district. Many Moon dealers come to the factory, select their models, and drive them home, saving freight charges.

Just look at the Moon. It's the kind of a car you will be proud to sell. Striking appearance, individual lines, roomy—all at a popular price. And now, read the specifications—they will prove that quality and reliability reign where Moon Cars are built.

Six-66

Seven Passenger Touring
and Club Roadster,

\$2500

f. o. b. St. Louis.

Specifications Six-66

125-inch wheelbase; Red Seal Continental Motor; honeycomb radiator, new, high type, with removable shell; Delco starting and ignition; Timken axle and bearings; Stewart speedometer; double ventilating and rain-vision windshield; wide doors, with concealed locks and hinges; upholstered in Genuine Tan Spanish Leather.

Six-36

Five Passenger Touring,
Fully Equipped,

\$1485

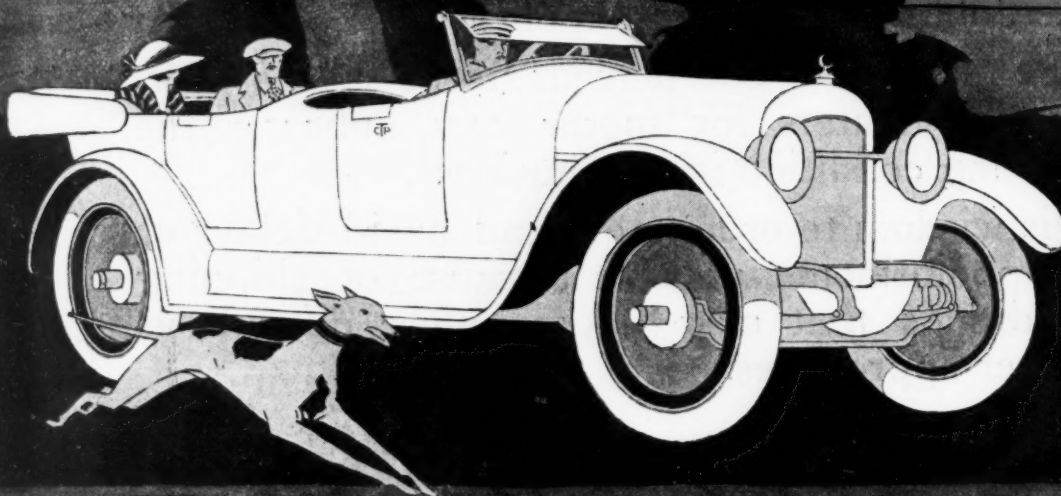
f. o. b. St. Louis.

Specifications Six-36

114-inch wheelbase; Red Seal Continental Motor; Fodders radiator, new, high honeycomb type; two unit starting and lighting system; solid walnut instrument board, front and rear; sweeping double cowl; slanting windshield; upholstered in Genuine Tan Spanish Leather.

Write immediately for particulars regarding some choice open territory where we desire to place a live dealer.

**MOON MOTOR CAR COMPANY,
ST. LOUIS, U. S. A.**



ANNOUNCING A NEW DEVELOPMENT IN THE AUTOMOTIVE INDUSTRY

The basic principle of the Robertson Cradlelock Wheel is parallel suspension of the load *within the rim* around the *entire* circumference of the wheel. Thus the shock absorbing and cushioning elements are located *at the rim* and not at the hub.

ROBERTSON CRADLELOCK WHEEL

A RESILIENT WHEEL FOR PASSENGER CARS—TRUCKS—AIRPLANES

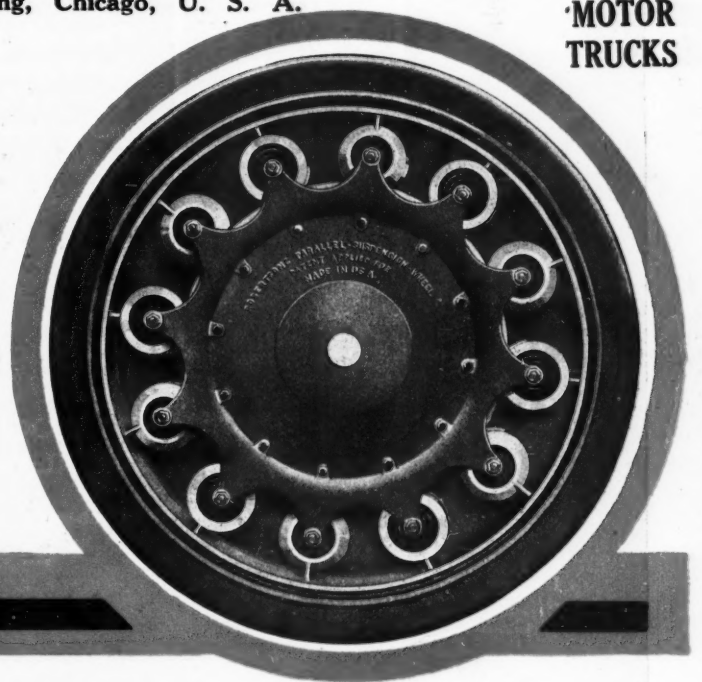
Under *all* conditions the load is supported in vertical planes or at right angles to the road surface, thereby detouring road shocks around the circumference of the wheel. In the usual method of radial suspension at the center of the wheel shocks are conveyed direct to the axle.

This wheel is *not* a pneumatic tire substitute. It decreases vibration by removing the load from the hub and distributing it around the rim—it decreases crystallization in the axle by preventing shocks from reaching that member.

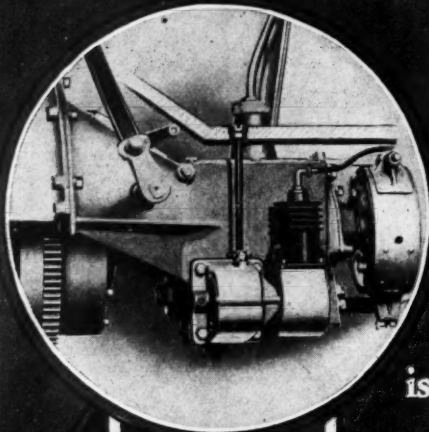
FOR
PASSENGER
CARS

ROBERTSON CRADLELOCK WHEEL CO.
1654 Monadnock Building, Chicago, U. S. A.

FOR
MOTOR
TRUCKS



When Writing to Advertisers, Please Mention Motor Age



KELLOGG

ENGINE DRIVEN

Tire Pump

**Under-Inflation
is the "Great Destroyer"
of Pneumatic Tires**

ON trucks it is all the more deadly because of the weight carried.

Pneumatic Truck Tires are here. They are a great success. They increase speed and decrease wear and tear.

But they would not be here and would not be successful without the Kellogg Engine-Driven Pump.

No driver could be depended upon to keep these big tires properly inflated with a hand pump. A powerful, dependable, unhurttable engine-driven pump, that delivers only clean, oil-free air to the tires, is absolutely essential to the success of a pneumatic-tired truck.

Pneumatic-tired trucks at the Battle-Front in France, as well as those of leading makes now traversing the roads of America, are Kellogg-equipped.



Regular Equipment With

ANDERSON
CADILLAC
CASE
COLE
CUNNINGHAM
DANIELS
DRUMMOND
FIAT
FRANKLIN
HAL
HAYNES
KING
McFARLAN
MAHMON
MOLINE-KNIGHT
MURRAY
NATIONAL
OVERLAND 89-6
OWEN MAGNETIC
PAIGE
PEERLESS
SIMPLEX
STANDARD
STEPHENS
TEMPLAR
WILLIS-KNIGHT
88-4 88-8

*"These cars are
fully equipped."*

For Every Car
on This List we
have a Kellogg
Pump that fits
like Standard
Equipment.

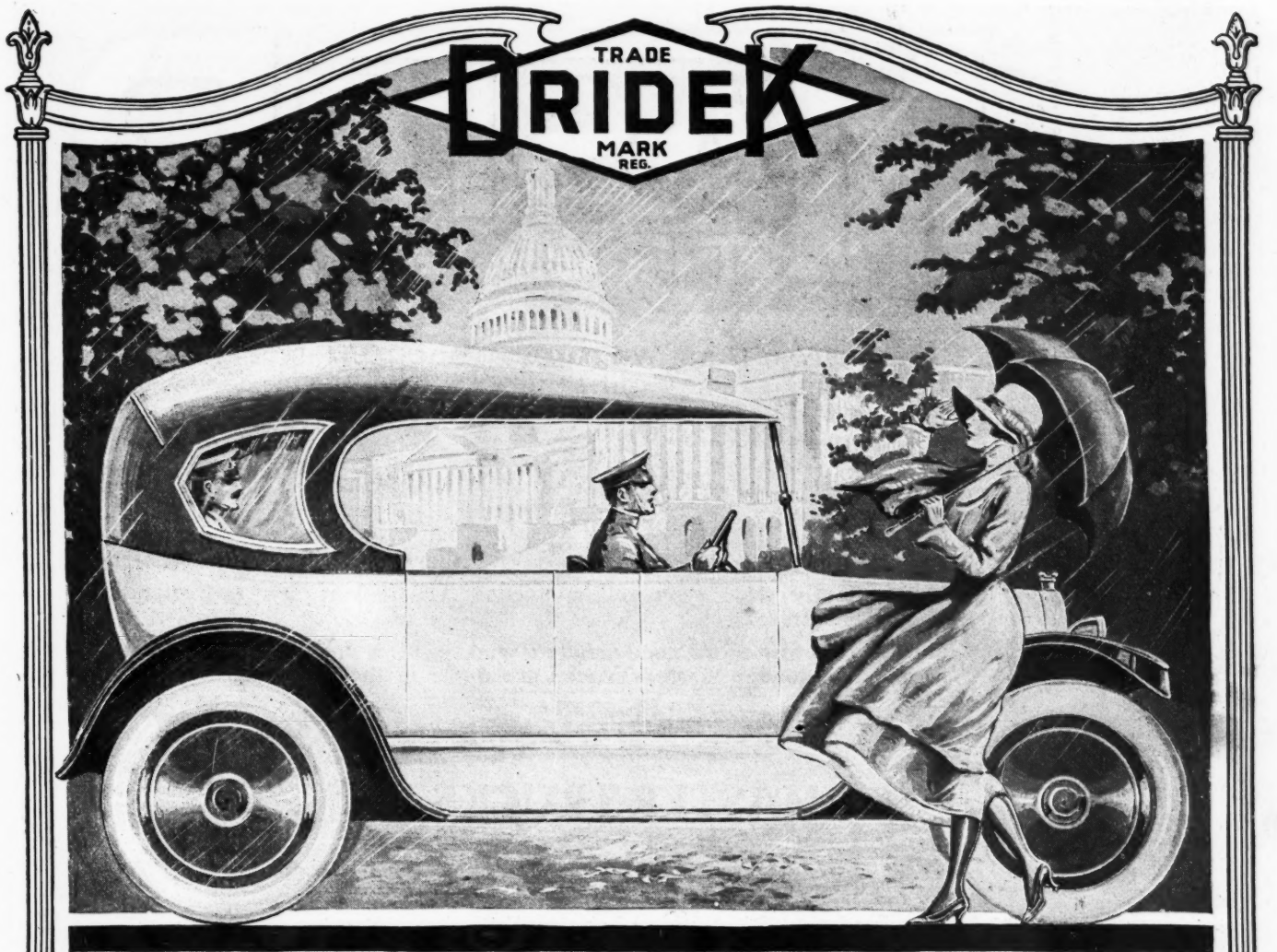
BUICK
CHANDLER
CHEVROLET
DODGE
FORD
HUDSON
NASH
OAKLAND
OLDSMOBILE
OVERLAND
REO

Mention make and
model when order-
ing.

**KELLOGG
MANUFACTURING CO.**

Rochester

New York



A DRIDEK Top Is Absolutely Waterproof!

**DRIDEK is the Most Remarkable Material Yet Produced
For Automobile Tops, Side Curtains and Upholstery.**

DRIDEK is soft and pliable, easy to work, does not scratch or chafe. Bull Dog Quality all through.

A DRIDEK Top on a new car indicates the desire of the manufacturer to equip his car with the best the market affords.

If you don't know all about DRIDEK send for samples and price list to Dept. C at once.

**L. J. MUTTY CO.,
Boston, Mass., U.S.A.**



MASTER TRUCKS

The biggest thing we can say about Master Trucks—the one thing that ought to interest you—the dealer—who is looking for a profitable truck line—is that the slogan

Master of the Load On ANY Road

really tells the Master story.

Master construction in every part is bigger—stronger—than necessary. Consequently when you sell a Master Truck you are *not* spending your profits in service.

We want a few more good dealers who want a full line of trucks that have made good. Master Trucks are made in the following sizes:

2-ton "M," internal gear drive
2-ton "O," long wheel base,
internal gear drive
2-ton "W," worm drive

2-ton "WL," long wheel base
worm drive
3½-ton "A," worm drive
5-ton "B," worm drive

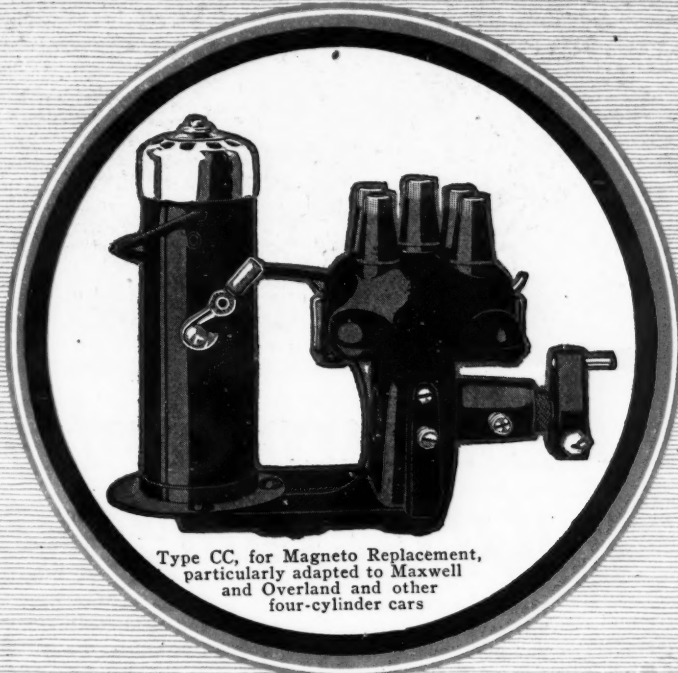
6-ton Tractor "T"

MASTER TRUCKS, Inc.

3137 S. Wabash Avenue
CHICAGO



When Writing to Advertisers, Please Mention Motor Age



ATWATER KENT

SCIENTIFIC IGNITION

With the big, hot spark the motorist gets greater power, acceleration becomes as smooth as velvet, gear shifting and motor stalling are reduced to a minimum and a considerable gas saving is effected. Starting is facilitated.

ATWATER KENT MFG. WORKS



4934 Stenton Avenue, PHILADELPHIA

When Writing to Advertisers, Please Mention Motor Age.



Don't scold your FORD if it gets full of carbon

Make your pistons tight and stop the carbon jinx. Munger "Always Tight" Piston Rings FIT and hold compression so that you can adjust your carburetor ACCURATELY.

You get perfect combustion; that means NO CARBON. The "Always Tight" Expansion Joint makes these rings PERMANENTLY gas-tight by compensating for wear as it occurs.



Price, \$1.25 each for all sizes up to 3-3/4 inches in diameter.

The complete FORD Set consists of eight regular size "Always Tight" Rings for the lower grooves and four over-width "Always Tight" Rings for the top grooves. With each complete FORD Set a Munger Regrooving Tool and a Munger Ring Insertion Tool are included FREE.

Get them from your supply dealer or garage man.

SPLITDORF ELECTRICAL CO.,

Newark, New Jersey

Santer Division: 1466 Michigan Ave., Chicago

SERVICE STATIONS:

Atlanta, 10-12 E. Harris Street
Boston, 63 Brookline Avenue
Chicago, 2613 S. Michigan Avenue
Dallas, 402 S. Ervay Street
Detroit, 1295 Woodward Avenue
Kansas City, 1827 Grand Avenue
Los Angeles, 1215 S. Hope Street

Minneapolis, 816 Hennepin Avenue
Newark, 278 Halsey Street
New York, 7 W. 61st Street
Philadelphia, 210 N. 13th Street
Pittsburgh, 5943 Ellsworth Avenue
San Francisco, 1022 Geary Street
Seattle, 1628 Broadway
Toronto, 469 Yonge Street

Guarantee—If these rings do not give entire satisfaction, return them to the dealer and get your money back.

Use

MUNGER

"Always Tight" Piston Rings



Dixon's Solve Your Lubrication Problem

Metal-to-metal contact in bearing surfaces causes friction. Unchecked it reduces your power, increases expense and hastens the end of your car's usefulness. Prevent friction by using the common sense kind of lubrication—

DIXON'S GRAPHITE Automobile LUBRICANTS

"The graphite is the reason"

Dixonizing puts a wear-resisting film of selected flake graphite over the metal surfaces.

Dixon's alone prevent grinding

and give you a better-running and longer-lasting car.

Write for the Dixon Lubricating Chart No. 82-G.

JOSEPH DIXON CRUCIBLE COMPANY

JERSEY CITY, NEW JERSEY

Established 1827





Automatic Air Valve

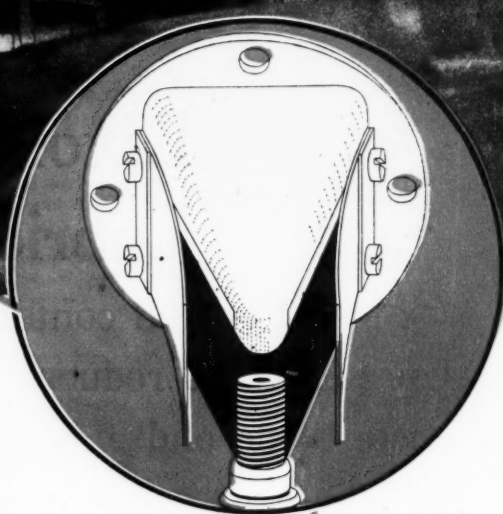
Prominent in the minds of engineers and builders of motor vehicles is this, one of many advantages, of the Tillotson carburetor—

It is the air valve itself that forms the restricted passage for the air passing through the carburetor and it consists merely of two flexible, easily yielding steel reeds, which open and close in proportion to the throttle opening.

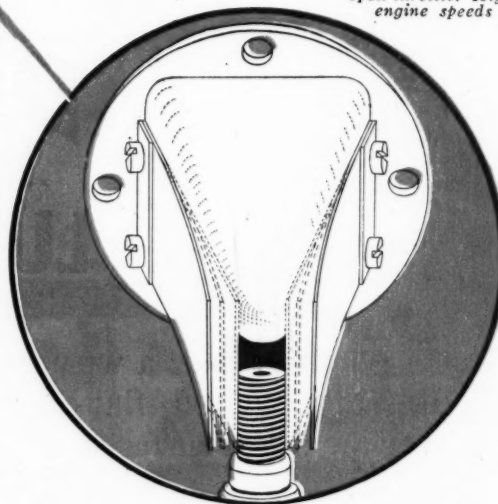
Strictly automatic in its action, this air valve provides that at all engine speeds the highest air velocity in the carburetor is at the fuel supply nozzle.

Only one adjustment is required—gasoline. There are no working or sliding parts to cause friction and wear.

Let us figure on your requirements.




Position of reeds at wide open throttle. High engine speeds



Intermediate position of reeds changing with varying engine speeds

The Tillotson Manufacturing Company
Toledo, Ohio




Traffic Truck

4000 LBS. CAPACITY

\$1195

THE LOWEST PRICED 4000 LB. CAPACITY TRUCK IN THE WORLD



The "Ace" of American Trucks

The "Traffic" has conquered. It has won over all competition by clearing the field of every obstacle between the dealer and user with its performance and price. Trucks are helping to Win the War and in face of the Nation's draft for man-power—farmers, merchants and manufacturers realize the importance of motorizing their hauling, because—

Some "Traffic" Features

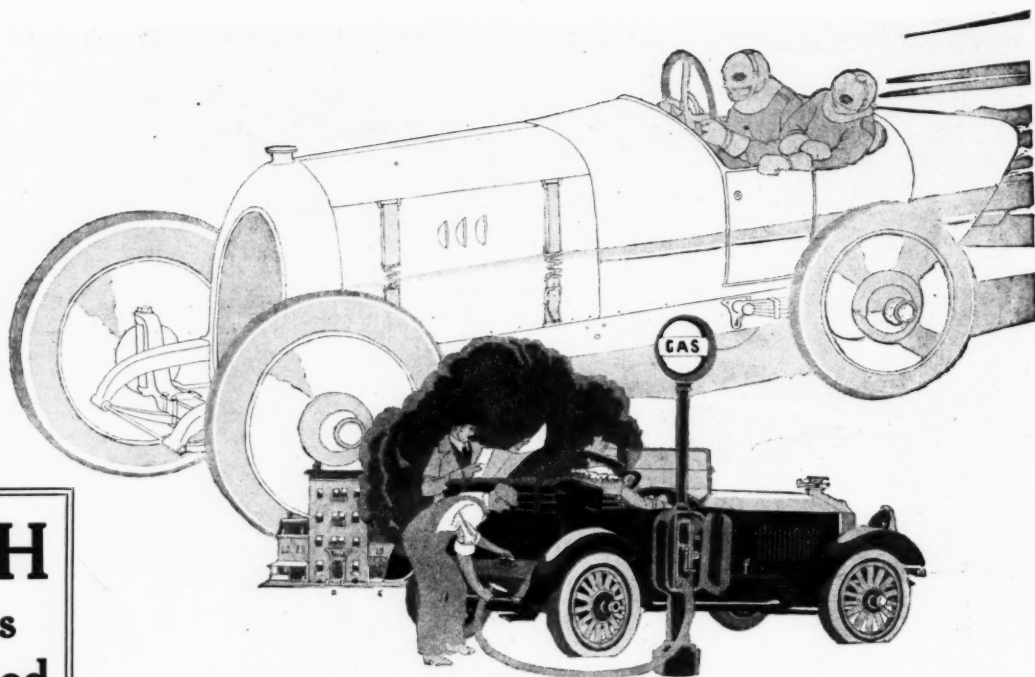
Weight, 3,300 lbs.; Gray Motor, 4-cylinder valve-in-head, 35 h. p. Covert Transmission; Borg & Beck disc clutch; Kingston Magneto; Cellular type radiator; Drop forged front axle with Timken roller bearings; Russell rear axle, internal gear, roller bearings; semi-elliptic front and rear springs; 6-inch U-channel frame; Standard Fisk tires; 133-inch wheelbase; 122-inch length of frame behind driver's seat; oil cup lubricating system—and many other features for perfect performance.

Speed and efficiency coupled with economy is the call of the hour and the Traffic Truck has fully answered it.

The "Traffic" is all truck—everything that counts for performance has been put in—fancies and frills have been left out—it is built for work—not beauty, and is the greatest truck value in the world today.

Representative dealers who figured on the future as well as the present with "Traffic" are now enjoying a profitable go-ahead business—if you think you can measure up to our requirements, there is still some territory open. Wire first to find out whether or not your territory is covered—it will save us both time.

Traffic Motor Truck Corporation
3807-19 Laclede Avenue St. Louis, Mo.



RAJAH Shipments Are Delayed

Shipments of Rajah Plugs are considerably delayed owing to heavy government requirements placed with the Rajah factory.

In some sections of the country Rajah Plugs are almost unobtainable. *Don't let this happen to you.*

We strongly urge you to place your orders now, anticipating your requirements as far ahead as possible to insure your having stock on hand.

Rajah Terminals and Adapters

are furnished so that Rajah Plugs can be used with any car.



Rajah Regular and Ferrule Clip Terminals

Adjustable to any cable and with ferrule to fit any cable. With the extra collar supplied both can be used with any make of plug.



Rajah Thumb Nut and Stud Terminals

The Thumb nut is an adapter for Dodge, Ford, Hup, Hudson, Maxwell, Mitchell, Packard Twin Six and Pullman. The Stud for Buick, Chevrolet and Oldsmobile.



Rajah Ball Terminal

Adapter for Franklin, Locomobile and Willys-Knight.

Manufactured by
Rajah Auto-Supply Co.
Bloomfield, N. J.

Sales Department
Edward A. Cassidy Co., Inc.
280 Madison Ave., New York

The Government asks car owners to save gasoline

The car owner knows that a leak in his ignition is as wasteful as a leak in his gasoline tank.

Sell the Rajah—the plug that conserves gas. Its quick, hot, brilliant spark unfailingly ignites every atom of the mixture. Its gas-tight construction and special heat-resisting porcelain permit no power leakage. Every ounce of energy is delivered behind the pistons.

In racing cars, airplanes and speed boats, where the gas engine is put to its severest test, Rajah Plugs are daily demonstrating this exceptional service.



Note: To give your customers 100 per cent efficiency see that they install a complete set of Rajahs.

Rajah Terminals are furnished so that Rajah Plugs can be used on any make of car.

RAJAH SPARK PLUGS

When Writing to Advertisers, Please Mention Motor Age



1902-1918

Time Demonstrates Ability

It is not an occasional success, a set of axles that now and then makes an astonishing record, that demonstrates ability.

It is the long record of many years of steady reliability—anticipating all the changes in axle types and designs and maintaining unbroken leadership for sixteen years.

Every time the Timken-Detroit mark is placed on an axle it increases Timken-Detroit responsibility; for it expresses our recognition of the fact that this past record must be maintained.

And it is your assurance that the axles under your car are built upon all that the experience of the past can contribute to the needs of the present.

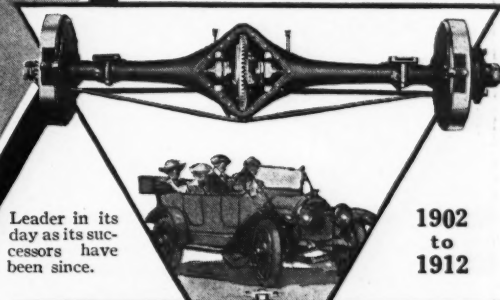


THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan

Oldest and largest builders of front and rear axles for both motor cars and trucks.

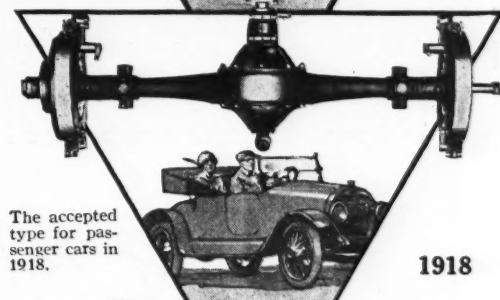
TIMKEN-DETROIT AXLES

When Writing to Advertisers, Please Mention Motor Age



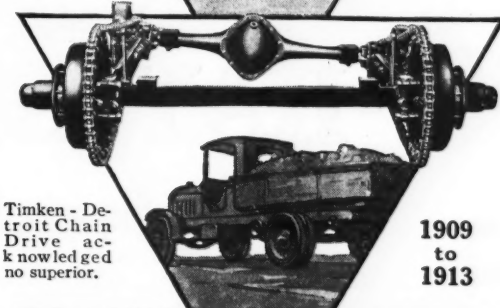
Leader in its day as its successors have been since.

1902
to
1912



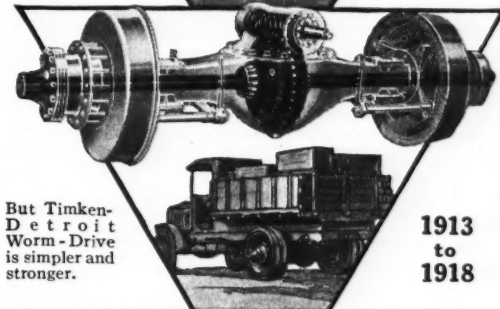
The accepted type for passenger cars in 1918.

1918



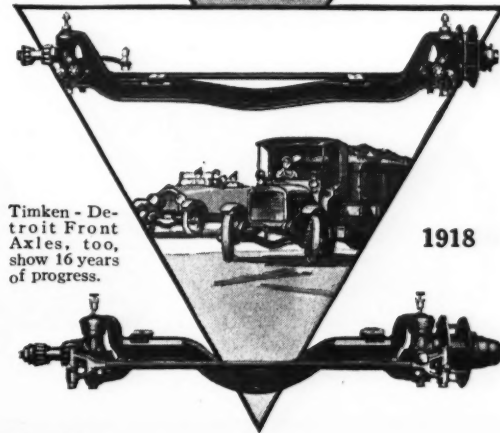
Timken - Detroit Chain Drive acknowledged no superior.

1909
to
1913



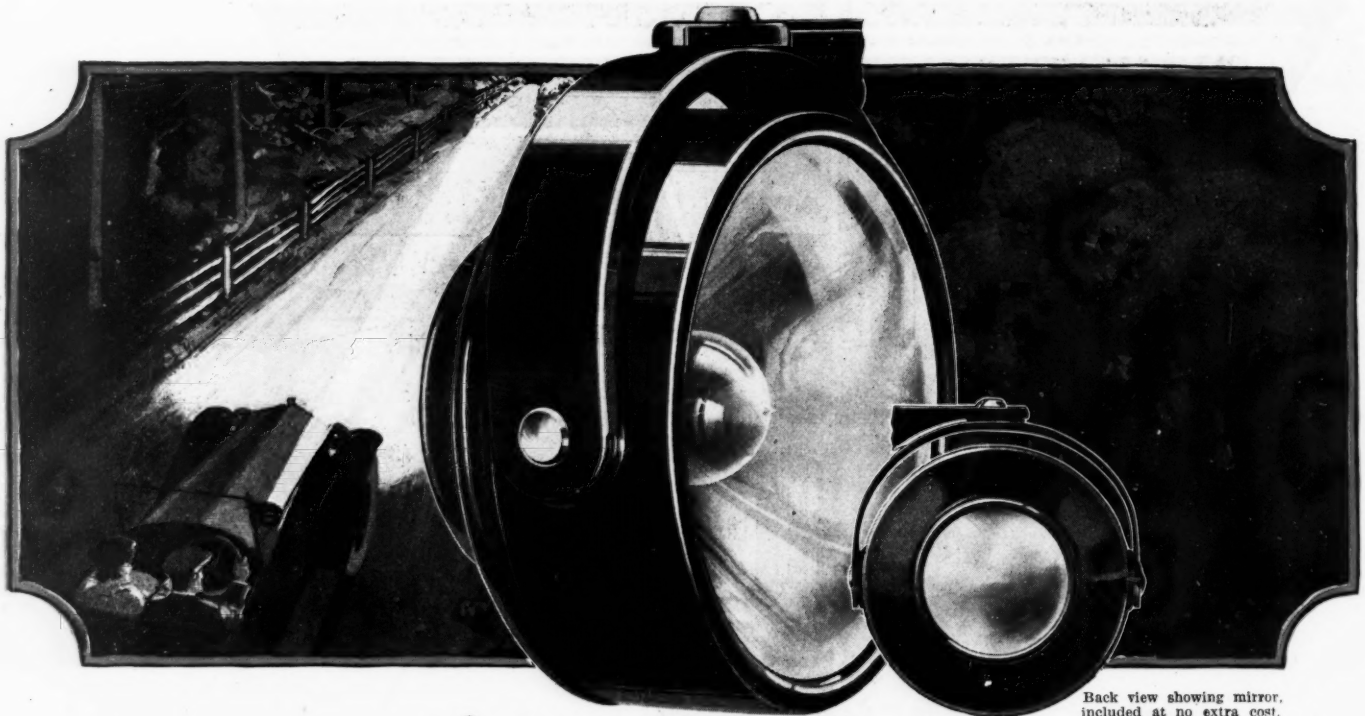
But Timken-Detroit Worm-Drive is simpler and stronger.

1913
to
1918



Timken - Detroit Front Axles, too, show 16 years of progress.

1918



Back view showing mirror,
included at no extra cost.

\$5.00
Complete
with bracket
and
electric cord

Stewart V-RAY SEARCHLIGHT

A Real Searchlight—Not a “Spotlight”

When you have occasion to use a Searchlight, you want a *real* searchlight—not a “spotlight” with its small restricted “spot” of light.

You want a strong, powerful, all-revealing searchlight beam.

That is what you have in the Stewart V-Ray Searchlight.

Its penetrating shaft of light shoots 'way down the road, revealing even most distant objects.

The exterior design is particularly noteworthy. See how it stands apart, a thing of beauty. Observe how symmetrical it is. Note the design of the body; also the back.

It is beautifully finished with many coats of jet black enamel, baked on. And, there is just a touch of nickel here and there to make the “tailor-made” appearance complete.

The Stewart V-Ray Searchlight harmonizes with the design of the modern automobile. Adds to its appearance. Looks like a built-in part of the car—not like a misplaced, re-vamped headlight.

It is scientifically designed. Made with a perfect parabolic reflector which is silver-plated—not polished tin. Has a full six inch curved lens, instead of plain window glass.

A 3¼ inch reducing mirror, included at no extra cost, is located in the center of the back. It is not necessary to twist the light at an unsightly angle to use mirror. The switch is located conveniently so the hand finds it instantly in the dark.

The back is so formed that the hand grasps the light naturally, without cramping—and turns the light in any direction—up, down, right, left, front, or back—with ease. The case is absolutely dust and

moisture-proof. A focusing device permits the use of any size bulb.

The bracket—an exclusive Stewart feature—not only permits turning the light in any direction, but also fits any wind shield.

Both its handsome appearance and complete utility recommend it. It has high quality and finish all the way through. Its low price—\$5.00—is not an indication of quality, but a tribute to the Stewart Organization, which makes quality accessories at popular prices possible through large quantity production.

And so it is with all Stewart Automobile Accessories. Each because of sheer merit and high quality deserves a place in the equipment of every automobile.

Stewart Accessories are sold by leading accessory dealers, jobbers and garages everywhere.

Stewart-Warner Speedometer Corporation

Chicago, U. S. A.



Stewart
Speedometer
\$25

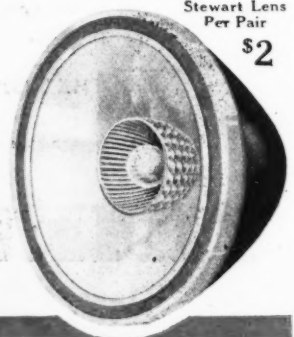


Stewart Motor Driven
Warning Signal
Hand Operated Type **\$3.50**

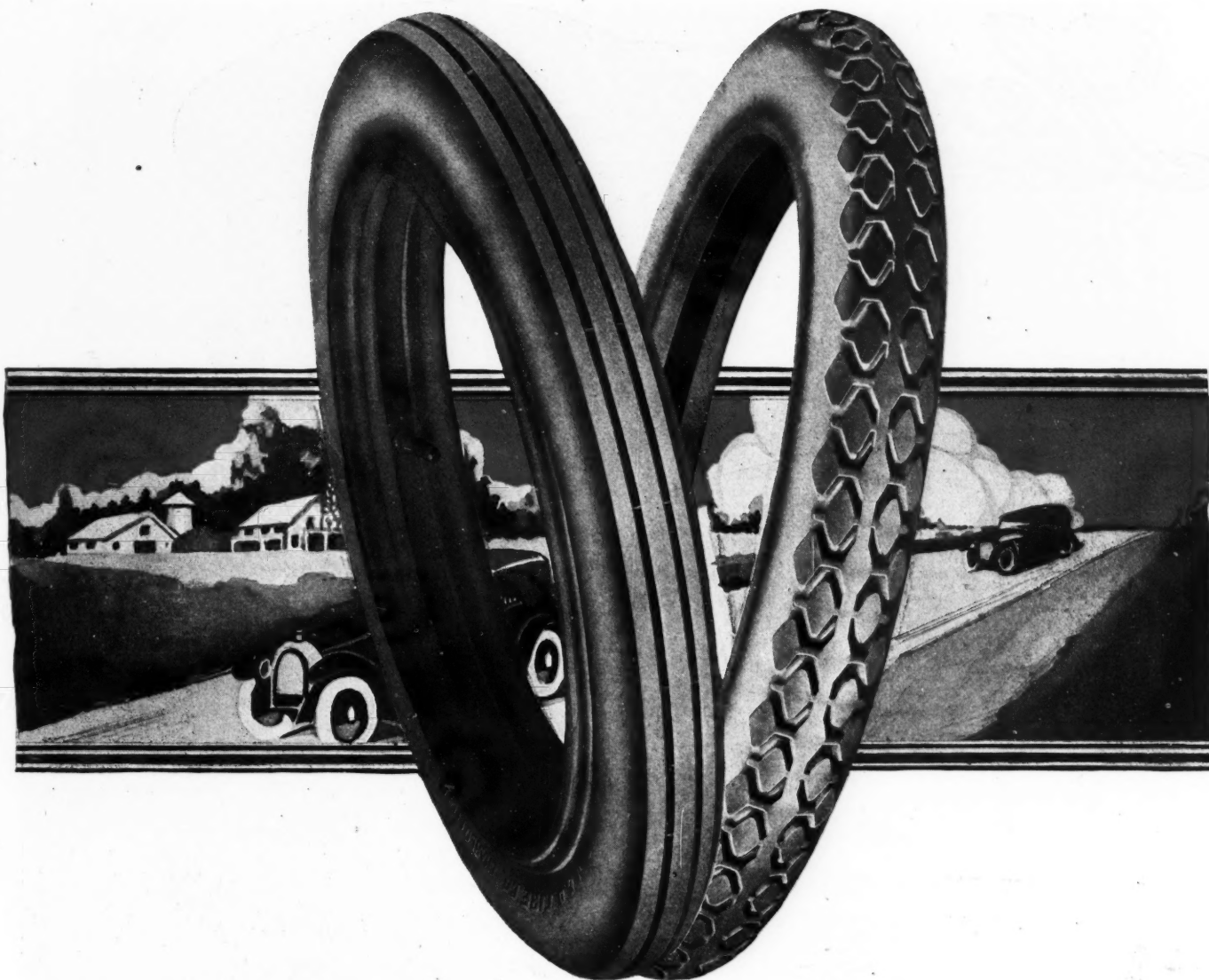
Stewart
Vacuum System
\$10



Stewart Lens
Per Pair
\$2



When Writing to Advertisers, Please Mention Motor Age



Performance Brings Resales

Resales are the Life of Legitimate Business

We aim to give our dealers *something more to sell tires on* than an adjustment guarantee. Since virtually every tire made has one now-a-days—adjustment guarantees can't help sales much. Motorists take it for granted.

We let you sell J & D Tires with an adjustment guarantee because everybody expects one, but J & D Tires *practically eliminate* adjustments. Your customers would rather have performance. They don't want the bother of adjustments—you don't want the bother of adjustments.

Our practice is to make our tires *uniformly* good. We give them a

conservative guarantee of 5,000 miles—for a 5,000-mile price—and build them so that a *bigger per cent* surpass 5,000 miles than do tires with bigger mileage guarantee. *Our tires average up* better. We make fewer records but please more customers. They are the kind of goods *they can depend on*.

And since we sell through exclusive agencies only—this means regular resales for you at a liberal margin of profit.

Increased production has enabled us to take on a limited number of reliable dealers distributors—if your territory is still open write us about it.



J & D Tire Company

New York Office,

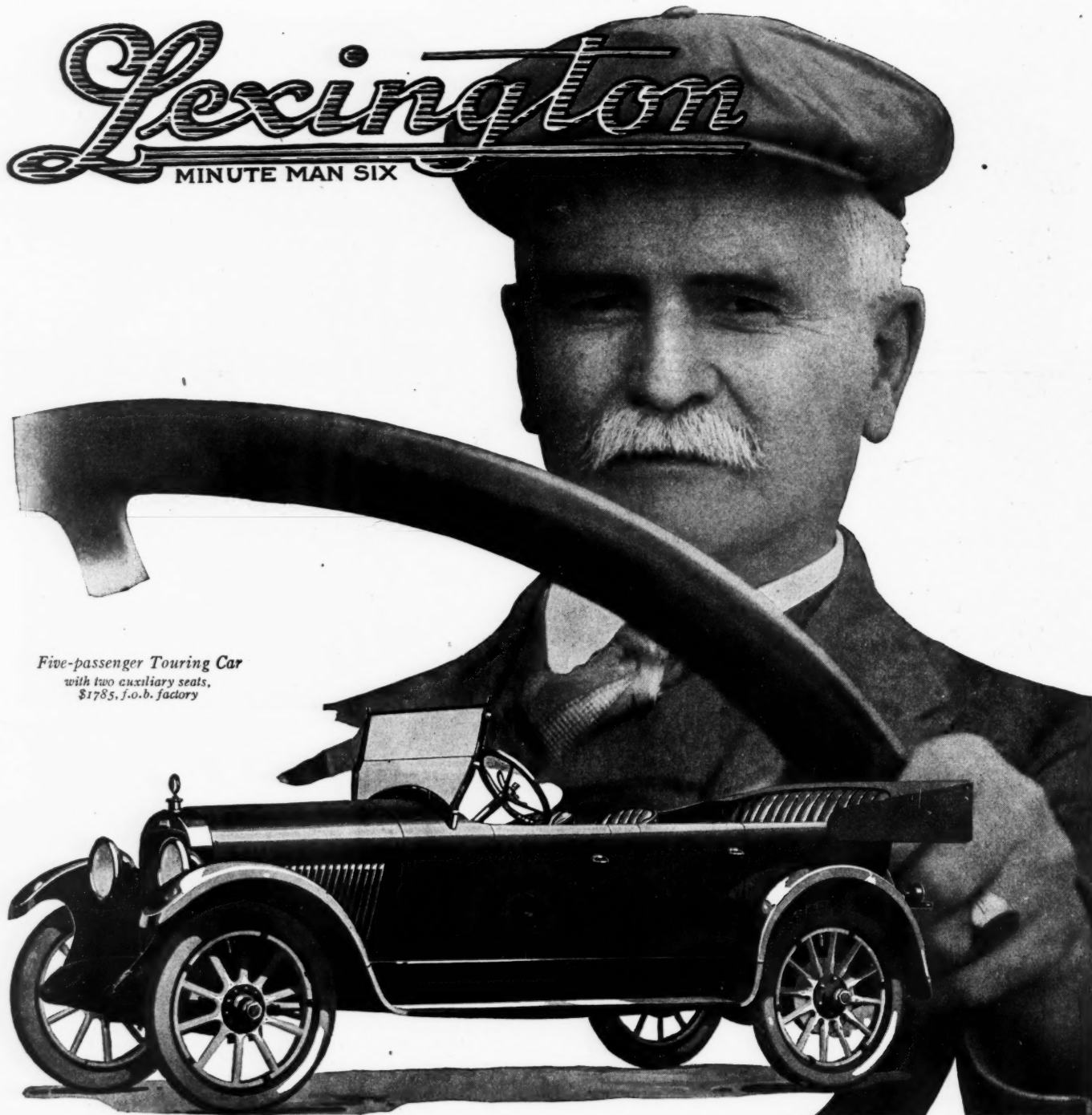
Charlotte, N. C.

1834 Broadway

When Writing to Advertisers, Please Mention Motor Age.

Lexington

MINUTE MAN SIX



*Five-passenger Touring Car
with two auxiliary seats,
\$1785, f.o.b. factory*

The Choice of Responsible Dealers

NOW is not the time for experiments or innovations.

More is required of a car today: longer service, greater economy, less depreciation!

Owners and dealers know a mediocre car is an ultimate waste of money as well as an immediate handicap. People are buying now with years ahead in view.

They know they can put implicit confidence in Lexington cars and in the policy of the institution behind them.

This new Lexington is fundamentally the same remarkably successful car that has withstood all tests for a whole year in every climate. Improvements have been added that enhance its value.

The sum-total of goodness of this car is possible at its price only because 10 large factories, devoted to automobile parts, are affiliated with and contribute to Lexington, thus insuring a better car for less money.

Write us for complete information on all Lexington models and dealership proposition.

Five-passenger Tourabout, \$1685; Three-passenger Coupelet, \$2450; Five-passenger Touring Car, with two auxiliary seats, \$1785; Four-passenger Sedanette, \$2550; Five-passenger Convertible Sedan, with two auxiliary seats, \$1985; Four-passenger Coupe, \$2650; Five-passenger Salon Sedan, with two auxiliary seats, \$2750; Five-passenger Limousine-Brougham, \$3250. All prices f.o.b. factory and subject to change without notice. Wire wheels \$100 additional on all models listed above.

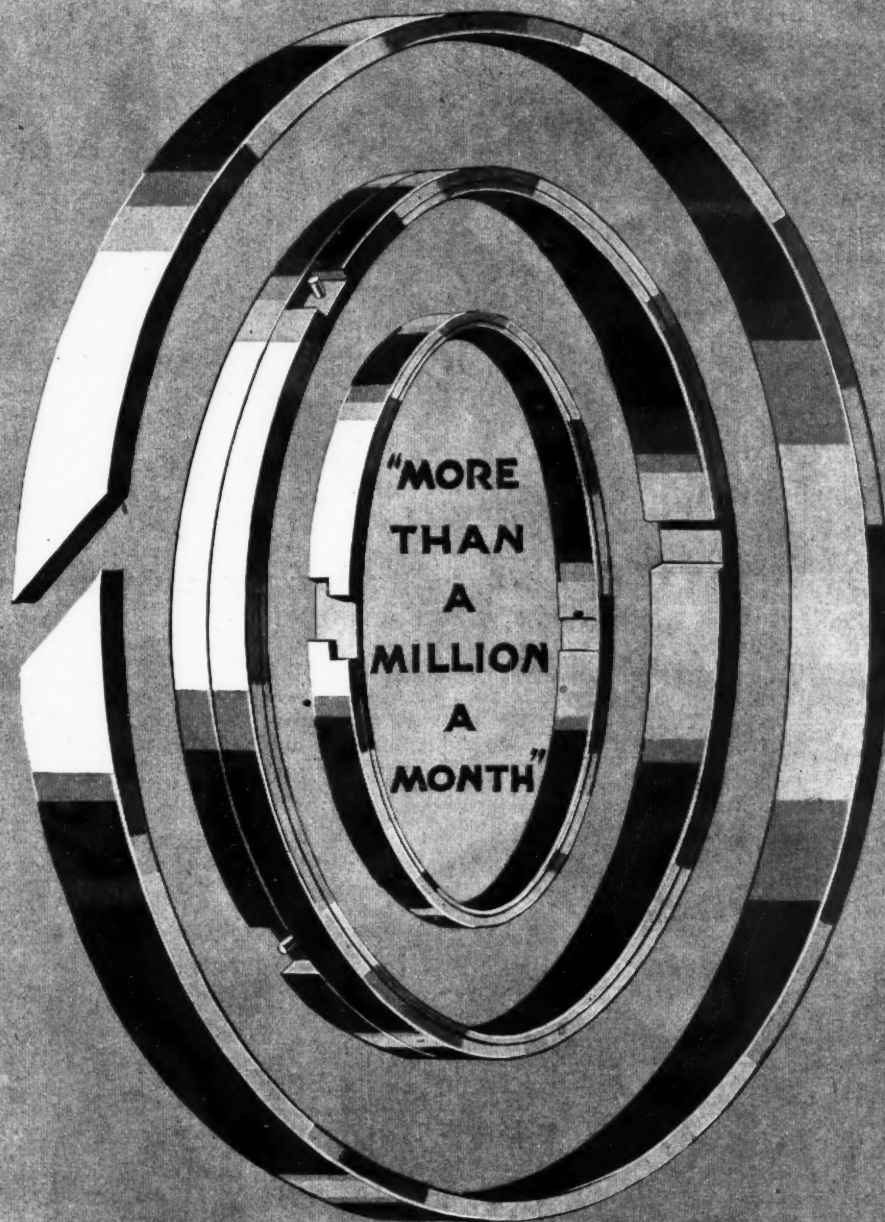
Lexington Motor Company,



Connersville, Ind., U. S. A.

When Writing to Advertisers, Please Mention Motor Age

QUALITY STA-TITE DUPLEX PISTON RINGS



SEND FOR "TWELVE REASONS" BOOKLET

The Piston
RING COMPANY
SPECIALISTS IN PISTON RINGS

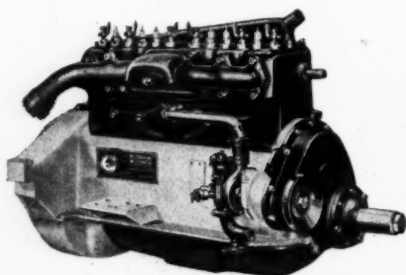
102 SANFORD ST.

MUSKEGON, MICH.



"The whole car is of the same high quality as its Red Seal Continental Motor."

America's Standard
Truck Motor. Look
for the Red Seal
Nameplate



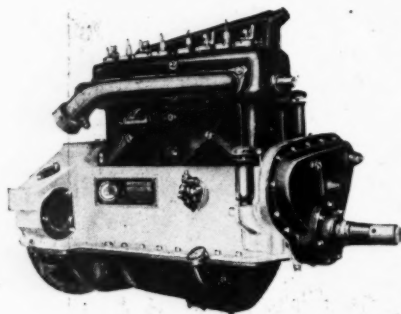
The manufacturer who uses the Continental Red Seal Motor in the car or truck he makes is a manufacturer whose standards are high.

He uses the Continental because he knows it is a motor he can depend on—a motor embodying nothing untried, nothing experimental—a motor whose worth is a *certainty*. He knows this because he has seen the Continental proved in hundreds of thousands of automobiles and trucks—of many makes and kinds—under every conceivable condition of service.

Naturally, he exercises the same good judgment in the selection of the other units that go to make up his car or truck. Reliability is his watchword, and he sees to it that everything in his product measures up to the high standard set by the Continental Red Seal Motor.

Today over 160 manufacturers use this famous motor in the cars or trucks they make. It is significant that among these are found many of the leaders in the motor vehicle industry. It is equally significant that the dealer in Continental equipped vehicles is usually a very successful one.

Look for the Red Seal (shown above) on the motor in the car or truck you buy. It's your guarantee of motor quality—as well as your assurance of a good car or truck.



America's Standard
Passenger Car Mo-
tor—Look for the
Red Seal Nameplate

CONTINENTAL MOTORS CORPORATION

Offices:

Detroit, Michigan

Factories:

Detroit—Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

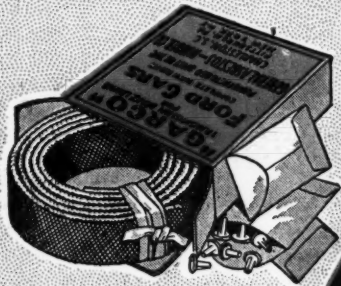
STANDARD POWER FOR AUTOMOBILES AND TRUCKS

When Writing to Advertisers, Please Mention Motor Age

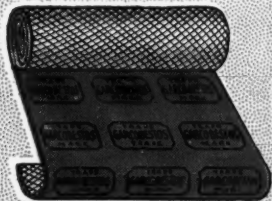
GARCO ASBESTOS PRODUCTS



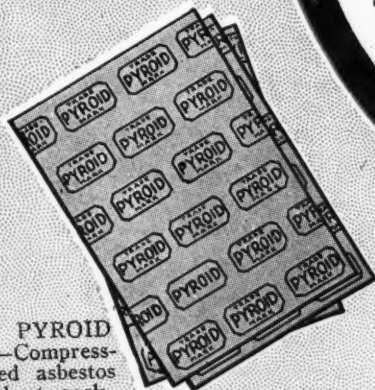
for DEALERS and REPAIRMEN



GARCO TRANSMISSION BAND LINING
For FORDS—Complete sets with rivets or in 50- and 100-foot rolls.

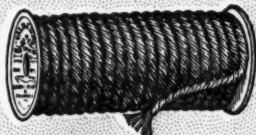


GARCOBESTOS—wire inserted asbestos sheet packing.



PYROID
—Compressed asbestos sheet packing without wire.

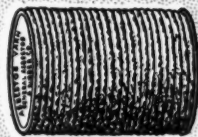
VALRESTINE
Valve stem packing. Thoroughly lubricated.



GARCO Asbestos
Wick and Rope. All sizes—for a thousand uses.



GARCO GASKETTE ROLL—1 piece of highest grade sheet packing 10-in. wide, 40-in. long.



GARCO SPARK PLUG YARN
1 dozen 2-oz. spools to box.



GARCO BRAKE LINING

To thousands of keen, progressive dealers and repairmen in every part of the country—to tens of thousands of motor car owners—GARCO is a synonym for sterling dependability in Brake Lining.

GARCO dealers have steadily doubled and re-doubled their orders. They have found the unfailing "Safety-Insurance" of GARCO Brake Lining led straight to bigger business—bigger profits—not only on brake lining but on all high-class accessories.

Listed here are other GARCO Asbestos Products of equal interest to every repairman. For instance, GARCO Transmission Band Lining for Fords is made of better materials than other kinds. That it should give better service and sell easier is a natural result.

The GARCO Gasket Roll is brand new. In this durable, convenient carton is just the amount of high-grade gasket material you would like to use. Saves paying high prices for cut pieces—eliminates big stock.

Decide now to use the best and sell the best. Your jobber will be glad to give you prices. Write us for samples and full information if you prefer.

GENERAL ASBESTOS & RUBBER CO.

Main Offices and Factories, CHARLESTON, S. C.

Branches and Complete Stock:

58 Warren Street, New York
106 West Lake Street, Chicago
311 Water St., Pittsburgh

LARGEST MANUFACTURERS OF ASBESTOS TEXTILE PRODUCTS IN THE WORLD

When Writing to Advertisers, Please Mention Motor Age



There Are Two Kinds of Chassis Lubrication

Which Kind Do You Prefer?

OIL-LESS, involving no labor and preventing neglect, or the usual grease cup lubrication, involving extra labor and inviting neglect.

Today an increasing number of business men and women drive and care for their own cars because reliable drivers and machinists are scarce and garage costs are proportionately higher.

Truck users also, are facing a serious shortage of skilled drivers and everything that will save time or help make the truck trouble-proof is of increased value.

Under these circumstances it is more important than ever that the lubrication of chassis parts which are difficult to get at should be Oil-less.

It is only by the use of *Oil-less Bushings* that you can forget lubrication and be sure that you are not inviting serious trouble by neglect.

Once an *Oil-less Bushing* is installed as a bearing you are sure that everything is safe until the bearing wears out. You are actually insuring yourself against premature wear and breakdown.

In selecting a car or truck it pays to see that the chassis parts are standard equipped with *genuine Graphited Oil-less Bushings*.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARINGS COMPANY

"Specialists in the manufacture of Oil-less Bushings for more than a third of a century."

Bound Brook

New Jersey

N I C R U M

Trade Mark Reg. U. S. Pat. Off.

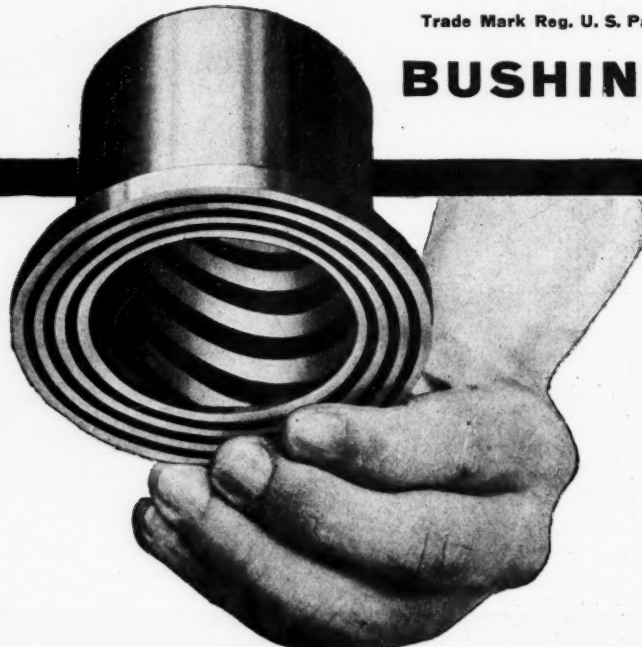
OIL-LESS



BOUND BROOK

Trade Mark Reg. U. S. Pat. Off.

BUSHINGS



When Writing to Advertisers, Please Mention Motor Age

HERCULES
SPARK PLUGS
"Strictly A Quality Product"
Eclipse Manufacturing Co.
Indianapolis, USA.

The illustration depicts Hercules, a muscular man with a lion's head and a feathered cape, holding a bow and arrow. He is standing on a rocky shore with a body of water and a large tree in the background. A large, detailed spark plug is shown on the right side of the illustration. The spark plug has the word "HERCULES" on its top insulator and "PAT 12-16-15" on its central body. The background of the illustration is a dark, stylized landscape with a large tree and a body of water.

ALONZO VINCENT-CLARKEN

Fifth Labor

When Writing to Advertisers, Please Mention Motor Age

The Production Manager of a Prominent Company says—

"I simply could not get along without 'The Red Directory' in building the Olympian car."



A handwritten signature in cursive script, reading "Louis B. Helm".

PRODUCTION MANAGER
OLYMPIAN MOTORS COMPANY
PONTIAC, MICHIGAN

Could you get along without your telephone?

Certainly not; because you realize that it is a great time saver. And the "Red Directory" represents just as big a time saver to Mr. Helm.

The next time you want information regarding something made in the trade turn to your copy. You will easily get both the buying and selling information you desire.

THE AUTOMOBILE TRADE DIRECTORY
ROBERT WOLFERS, President
213 WEST 39th STREET NEW YORK CITY

"It Hangs Everywhere"

A THOUSAND
CATALOGS
IN ONE



SHELDON

WORM GEAR AXLES



Any Ordinary Workman Can Demount These Wheels

When a nation is at war, its Government has first call on skilled labor. The needs of industry are subordinated.

Therefore, what labor is available must be conserved. It means getting the most done in the least time. It means utilizing untrained help wherever practicable.

The need for periodical truck inspection goes on just the same, no matter what kind of hands there are to do it. When wheel bearings need attention, tires need changing, brakes need relining, or a general examination is made, the huge rear wheels *must* come off.

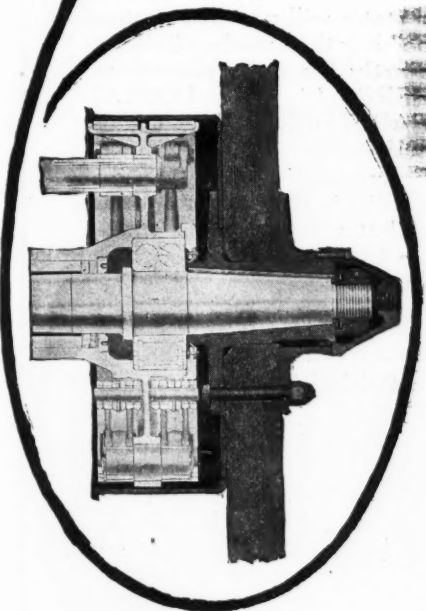
This not infrequently entails the practical disassembling of the rear axle—with hours of difficult labor, as in the case of the full floating type. And that *would* seem to demand the services of a skilled mechanic.

But any workman—and driver—can easily remove the rear wheels of a truck that is equipped with a Sheldon Worm Gear Axle. Just six simple operations—a matter of minutes—and the wheel comes off. The ball bearings remain enclosed all the while; he doesn't touch them.

However, if his wheel is off, and he *wants* to get at the bearings, he simply removes the bearing retainer—and there they are.

That's how Sheldon Axles save time. And as for labor—any man with ordinary intelligence and dependable habits can quickly learn to drive a Sheldon equipped truck, and *care for it*, as capably as any well trained mechanic.

For simplicity is as prominent a feature of Sheldon design as are sturdiness of construction and high quality of performance.



THAT TAPERED HUB MOUNTING

allows the easy demounting of wheels and makes inspection or tire changes quick, easy and economical. The shape of the hub also gives greatest strength where strength is most needed.

SHELDON AXLE & SPRING CO.

Makers of Springs and Axles for Heavy Duty Service for
more than Fifty Years

WILKES-BARRE, PENNSYLVANIA



When Writing to Advertisers, Please Mention Motor Age.

Important to the Public!

ENEMIES of magazines and magazine reading are now claiming that the heavier postage increases of 100 to 900 per cent in the destructive postal "zone" law falls **only** on the advertising pages and that the 50 per cent increase is merely upon the reading pages, therefore readers are not affected! **This is false in fact and principle!**

*As a magazine cannot be separated from its advertising—advertising which makes possible in its quality and quantity—this claim is fallacious and the postage increase must fall upon the readers of magazines **for the entire magazine**, no matter how deceptively it may be described and separated by the enemies of magazines and magazine readers.*

Do not be misled by the absurd camouflage that the destructive postal "zone" system affects **only** the advertising pages—**because the "zone" postage must be paid under the postal law for the entire magazine which you read.**

The advertising pages are part of each copy. These terrific postage increases of from 50 to 900 per cent are imbedded in each copy—depending upon the accidental remoteness of each reader—and necessarily apply, therefore, to each and every copy.

And the reckless efforts to disguise obviously unjust postage "zone" charges are plainly evidenced by the futile arguments of those who established the postal "zone" system—a "zone" system utterly condemned over fifty years ago when it was abolished by Abraham Lincoln.

Congress last year enacted this hasty but permanent postal legislation, despite the fact that it had been twice rejected by the United States Senate and also unequivocally condemned by the latest official United States Postal Commissions. This postal "zone" legislation reversed postal history. This postal zone law, moreover, has been condemned by Ambassador Gerard, who earnestly said it was a law that would **aid pro-German propaganda.**

The Hon. Charles E. Hughes headed the latest official United States Postal Commission, when he was Justice of the United States Supreme Court, and which reported emphatically against the postal "zone" system; and further emphasis is lent to this "zone" system condemnation by the statement of Charles E. Hughes himself, on June 27th of this year, 1918, in which he again states that this postal "zone" law **"is decidedly a looking-backward and walking-backward measure" in postal history!**

Magazines are sold to the reader at less than their cost of manufacture—the only manufactured product in the world of which this is true. Magazines are enabled to do this by reason of the revenue from advertising pages; and the increase of from 50 to 900 per cent postage on the advertising pages simply means that in that particular copy of the magazine are imbedded all of these postage increases running from 50 to

900 per cent falling, chiefly, with terrific postal increases in the West.

President Wilson explains the function of advertising in relation to readers and the public, for he said when Governor of New Jersey:

"It must be that those who are proposing this change of rates do not comprehend the effect it would have. **A tax upon the business of the more widely circulated magazines and periodicals would be a tax upon their means of living and performing their functions.**

"**They obtain their circulation by their direct appeal to the popular thought. Their circulation attracts advertisers. Their advertisements enable them to pay their writers and to enlarge their enterprise and influence.**

"This proposed new postal rate would be a direct tax, and a very serious one, upon the formation and expression of opinion—its more deliberate formation and expression just at a time when opinion is concerning itself actively and effectively with the deepest problems of our politics and our social life.

"To make such a change now, whatever its intentions in the minds of those who propose it, would be to attack and embarrass the free processes of opinion. Surely sober second thought will prevent any such mischievous blunder."

This discredited and reactionary postal "zone" system now resurrected in the face of a storm of protests from the ablest minds in our country, discriminates unfairly against readers in different states by reason of their accidental remoteness from the city of publication. Readers in Eastern and Northern states will pay **less** postage under this postal "zone" law than readers in Western states, **and for exactly the same magazines!**

REMEMBER—THERE IS NO POSTAL DEFICIT; LAST YEAR THERE WAS OVER \$12,000,000 SURPLUS!

Write to your Congressman in protest against the law and do it **NOW!** And if you will assist by another occasional letter or argument with a friend send your name to Charles Johnson Post, 200 Fifth Avenue, New York City.

Write to your Congressman at once!

DO IT NOW!

PETITION TO CONGRESS—Sign Here!

The spread of education, of culture, of scientific knowledge and advancement, and of our vast internal merchandising and manufacturing has been, and always is, vitally dependent upon the freest and cheapest circulation of periodicals. The penalties resulting from any restriction on the freest possible circulation of periodicals will be destructive of the best interests of our economic life and the opportunities of developing our best citizenship.

The postal amendment passed by the last Congress, increasing the postage on periodicals from **FIFTY TO NINE HUNDRED PER CENT** with its postal "zone" system, will throttle or destroy our periodicals at a time when the widest and most extensive circulation of publications is essential to the patriotism, education, and upbuilding of our country.

Therefore, I, the undersigned, do most earnestly demand the repeal of this burdensome periodical postage amendment.

Name

City or County

Street Address

State

Periodicals mean much in your life. If you will help by a few arguments with your acquaintances and an occasional letter to your Congressman in a spare moment, put a cross mark here

☒ **Will you help in securing the repeal of this iniquitous law?**

CUT OUT. MAIL TO CHARLES JOHNSON POST

Room 1417, 200 FIFTH AVENUE, NEW YORK CITY

Firestone

Blow-Out Patch

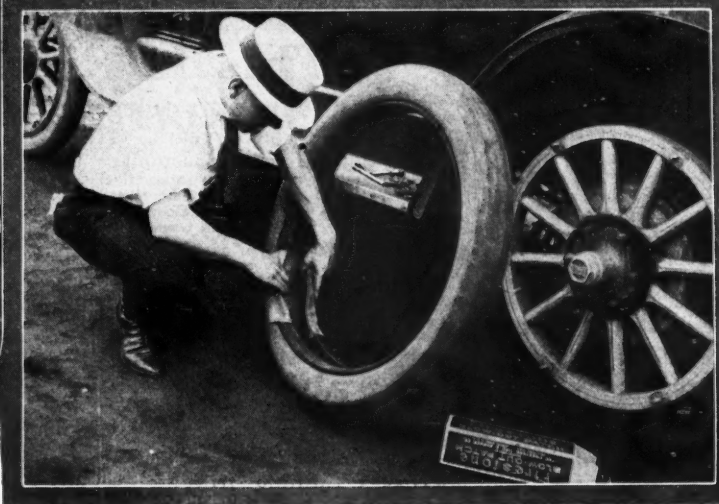
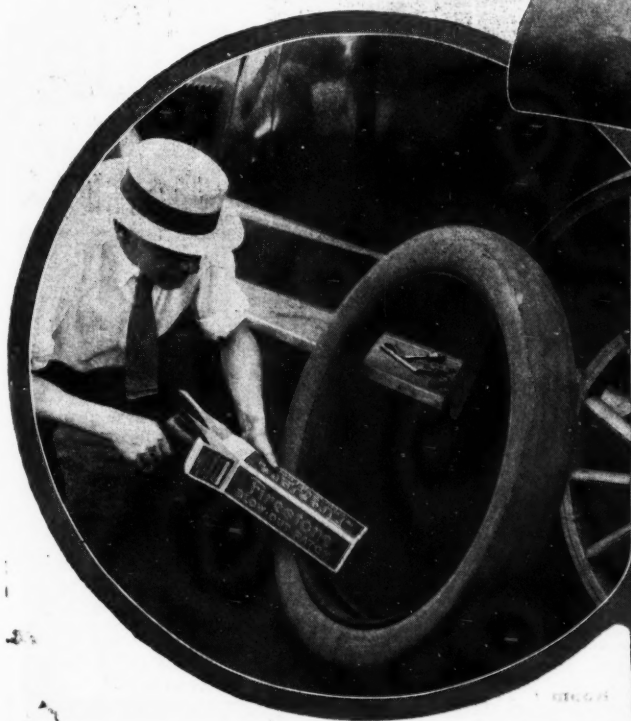
THE Firestone blow-out patch performs both duties, holds the blow-out securely and protects the inner tube while in the casing.

Built of six plies of rubberized fabric, it is flexible and yielding. It is protected at both ends by a molded-in real rubber tip, originated by Firestone, which does not allow the tube to come in contact with the raw, rough edges of the fabric. It is wide enough to extend from bead to bead. It is curved to fit snugly the inside dimensions of the case and cannot buckle, see illustration.

Authoritative figures show that one in every four car owners prefer Firestone blow-out patches. Firestone will make 5 million of the 20 million to be sold this year.

Order through your jobber or direct.

Firestone Tire and Rubber Co.
Firestone Park Akron, Ohio
World's Largest Manufacturers of Tire
Accessories and Repair Materials



When Writing to Advertisers, Please Mention Motor Age



YOU! CAN MAKE BIG SALES

with DUNN'S COUNTERBALANCES FOR FORD CARS

This is a proposition that **every** dealer should welcome. The possibilities are unprecedented—the sales many—the profits big. Right now we are doing an overwhelming business. We have had to increase our facilities greatly and are now prepared to handle an even larger volume of business.

Any Ford owner is convinced in a few minutes that this is a paying proposition for him. Not many sales are missed because this is absolutely one of the best Ford improvements ever announced.

DUNN'S COUNTERBALANCES for FORDS

MORE POWER—MORE SPEED—MORE ECONOMY
A PERFECTLY BALANCED CRANKSHAFT

PRICE
COMPLETE
ONLY
\$12

If your dealer
cannot supply
you order from
us direct, giv-
ing your deal-
er's name.



When attached to a Ford engine they produce a perfectly balanced crankshaft which in turn means an enormous reduction in vibration. Vibration in the motor will reduce power and speed because vibration is nothing more or less than lost motion or power. Reduce vibration and you automatically increase power and speed. By using a special wrench included free with each set, the time of installation is cut down to less than an hour.

DEALERS! We are receiving many orders direct that should be yours. The profits on these orders would be mighty pleasing to you. We can fill orders immediately. Wire or write today for our proposition. (Mail orders filled—where we are not represented—when accompanied by cash or specified C. O. D.)

DUNN COUNTERBALANCE COMPANY
Dept. 1, Clarinda, Iowa

Western Representative: Dunn Counterbalance Sales Co., 1220 San Pedro St., Los Angeles, Cal.



I LEARNED \$220000

IN FOUR MONTHS

This Is Richard A. Oldham

Mr. Oldham was telegraph operator for the Illinois Central Railroad for twenty years. He is fifty-eight years old. During all those twenty years, he drew the customary monthly salary of a telegraph operator—no more—no less. One day he read of my advertisement and the possibility of making money in the Auto Tire Repair Business. In a few weeks he had purchased and installed a Haywood outfit, and was doing business for himself. He was **His Own Boss**. A short time ago he wrote us that his income in four months was as much as it had been in Two and One-Half Years as Telegraph Operator. You men who have been left at home—who are beyond the draft age, and must take up the burdens left behind by others. Oldham is a living example of what can be done. I have 500 places to be filled now. 500 stations where tire repairing is neglected, because there is no one to do it.

I Must Have 500 Men to fill these places within the next sixty days

I have a big interesting book to send you—a book about tires—it explains this business—gives inside figures and profit. Gives actual proof of success—letters of others who are now operating Haywood Shops and making big money. What these men have done you can do. \$2,500 to \$4,000 a year is conservative. One machine will give you a start. You can see business all around you—everywhere there are automobiles there are tires that need repairing. You know that. All you do is open a shop—put out a Haywood sign, and auto owners will come to you and the service you bring them.

Sign the coupon and mail it today, or send a post card or letter.

HAYWOOD TIRE & EQUIPMENT CO.
M. HAYWOOD, President 501 Capitol Avenue, INDIANAPOLIS



M. HAYWOOD, Pres.
HAYWOOD TIRE & EQUIPMENT CO.
501 Capitol Avenue, Indianapolis, Ind.

Dear Sir: Please send me your book on Haywood Tire Repair Plants and full particulars on your National Tire Repair Service and details of your FREE school of tire repairing.

Name

Address

When Writing to Advertisers, Please Mention Motor Age.



A READY MADE MARKET

Progressive dealers are not "folding their hands" because of a car shortage. Live wires are pushing equipment to dress up old cars. They are selling to a ready-made market.

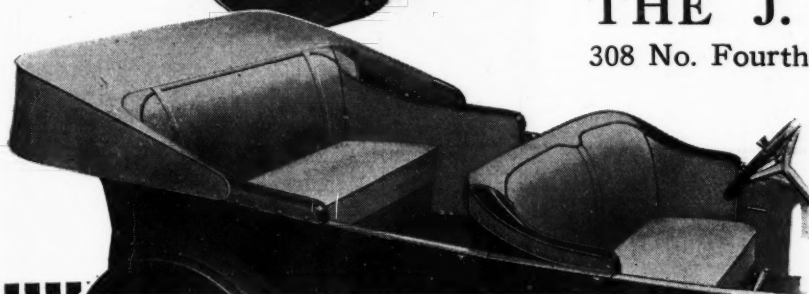
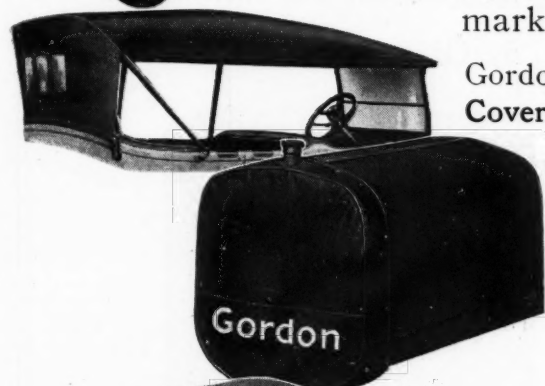
Gordon tailored-to-fit Seat Covers, Top Recoverings, Tire Covers and "Jack Frost" Radiator Robes will sell better than ever this season—they're thrift equipment. They pay a splendid margin of profit, are backed by real advertising, and are easily sold because they improve the old car.

Write or wire for dealer's confidential data NOW.

THE J. P. GORDON CO.

308 No. Fourth Street

Columbus, Ohio



GORDON
EASY-ON SEAT COVERS
TAILORED TO FIT

Install a Curtis Air Compressor



The Curtis Sign

Illustrated above—is 10x14 inches—baked enamel on steel. Cannot be bought, but is furnished FREE with every CURTIS Garage Air Compressor—and cannot be had in any other way.

Display a CURTIS "FREE AIR" SIGN above your door—it inspires confidence and will help build your business. Motorists are looking for this familiar CURTIS slogan—because they know oil rots tires—and that a CURTIS Air Compressor furnishes AIR FREE FROM OIL, which means fewer blowouts, greater tire mileage and less repairs. The CURTIS is the ONLY Garage Air Compressor with the controlled splash oiling system that eliminates all danger of forcing oil into the air line.

CURTIS AIR FREE FROM OIL

Investigate the many exclusive features of CURTIS Garage Air Compressors. The line is complete—five sizes—stationary or portable. Just write your name and address on the margin of this advertisement—tear it out and send it to your jobber, or to us direct, for complete information and prices.

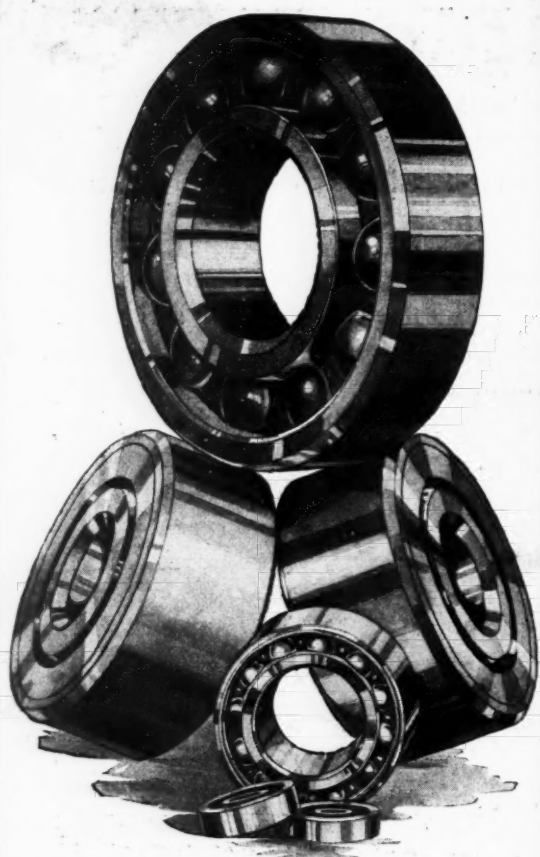
Curtis Pneumatic Machinery Co.

1527 Kienlen Ave., St. Louis, Mo.

Branch Office—530-H Hudson Terminal, New York City



When Writing to Advertisers, Please Mention Motor Age.



AIRPLANE crank shafts must be scrapped after about 200 to 250 hours service in the air—so terrific is the wear and tear.

New Departure Ball Bearings have been known to outlive two or three crank shafts in actual war service.

This is a good example of the endurance built into New Departure Ball Bearings by the use of special chrome alloy steel, correct design and superior manufacturing processes.

Have you received your copy of the new Ball Bearing Manual, illustrating and describing the use and misuse of ball bearings?

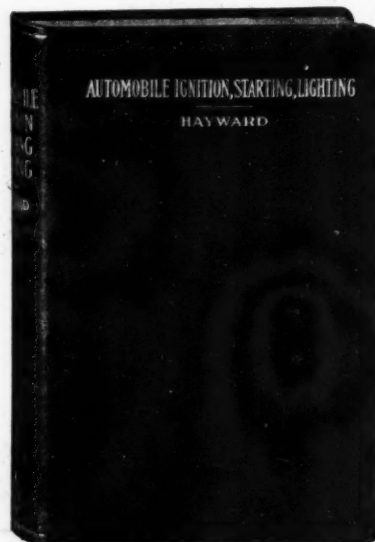
The New Departure Manufacturing Company,
Bristol, Conn. 363-A Detroit, Mich.
Conrad Patent Licensee.

**New Departure
Ball Bearings**

Automobile Ignition, Starting and Lighting

With Questions and Answers

By CHAS. B. HAYWARD



A comprehensive analysis of the electrical equipment of the modern automobile, including many wiring diagrams and details of all the important starting and lighting systems. It is one of the most popular text and reference books on the subject and should prove of exceptional value to either the student or the expert.

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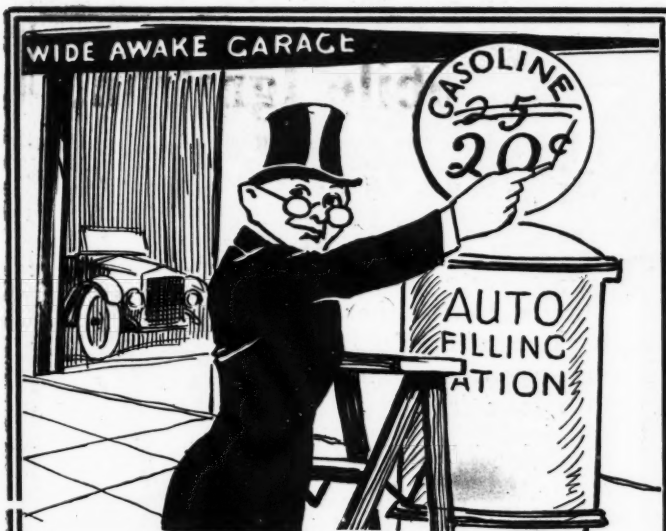
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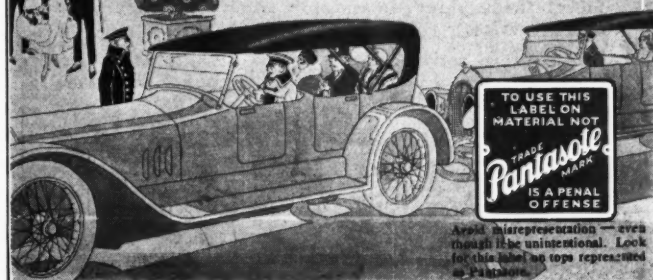
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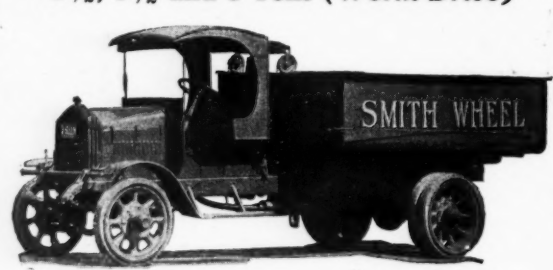
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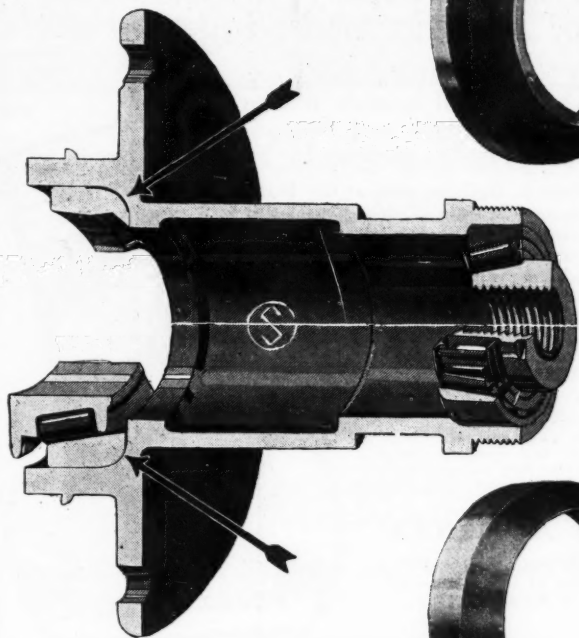
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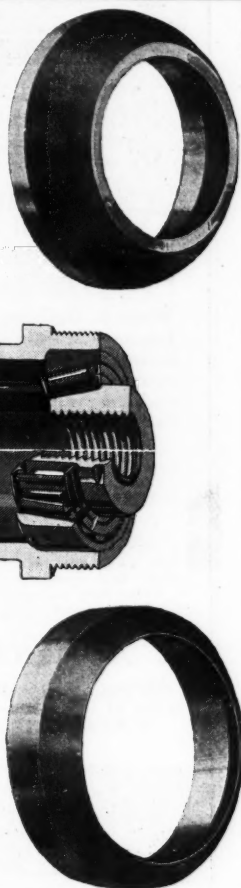
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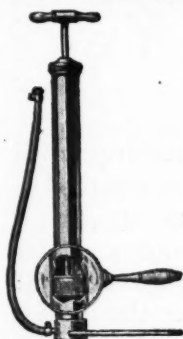
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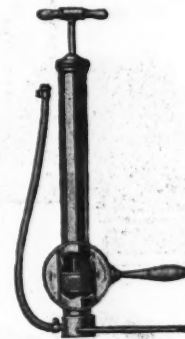
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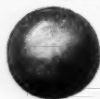


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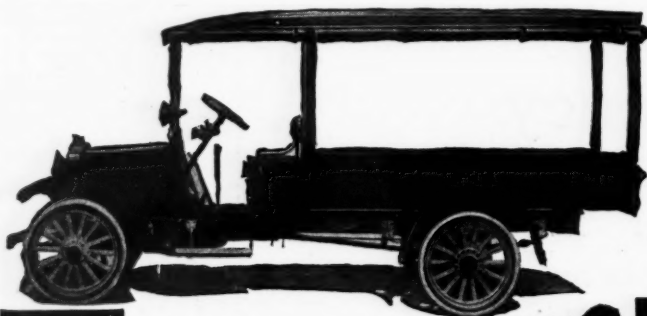
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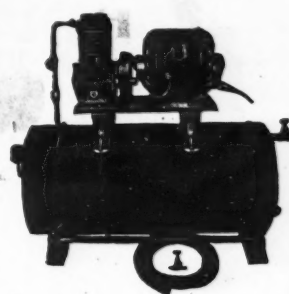
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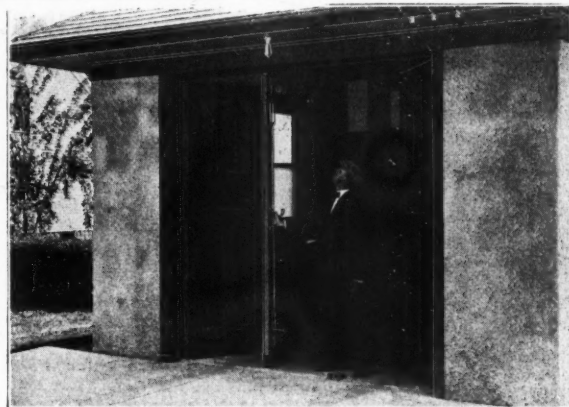
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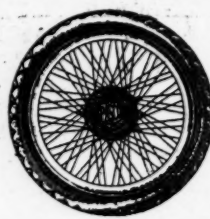
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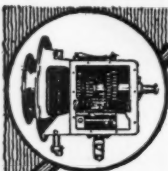
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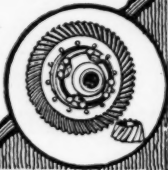


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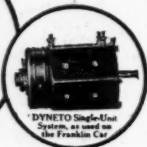
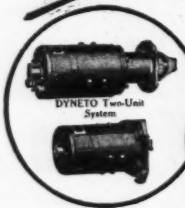
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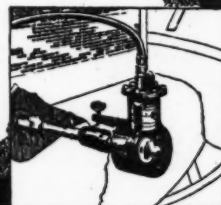
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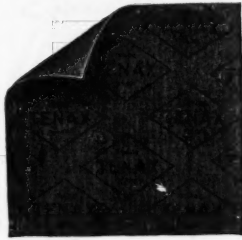
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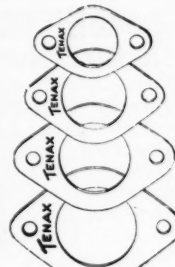
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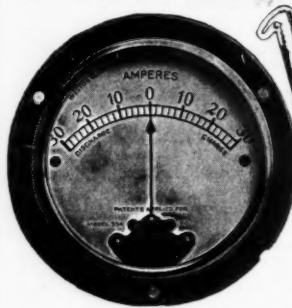
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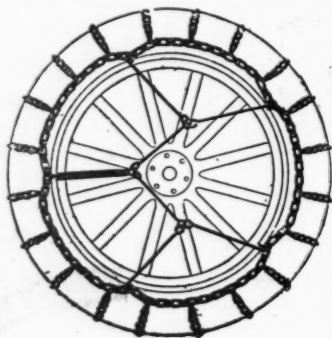
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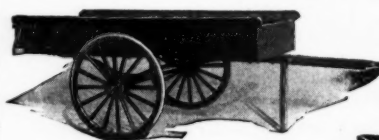
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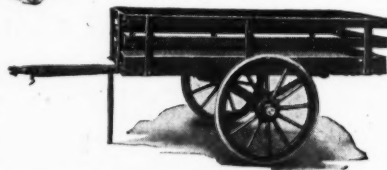
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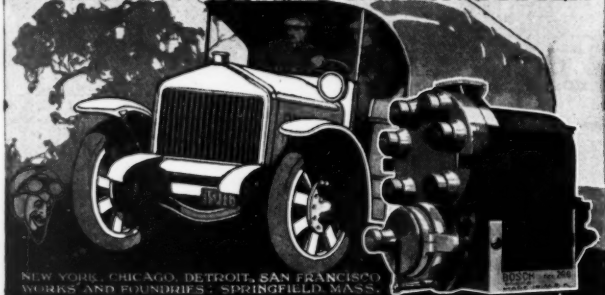


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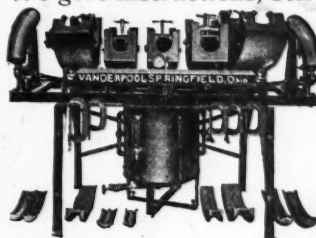
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Do as We Say and Make Big Money Open a Tire Repairing Shop

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Only vulcanizer recommended by leading tire factories because the only one that repairs tires exactly as they were made.

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THIS SEALS THE PUNCTURE.

These tubes are guaranteed against punctures for 5,000 miles and adjustment will be made on a mileage basis. No red tape—no arguments. We know our product and know it will give satisfaction. We do not guarantee against blowouts, cuts or pinches, but we do guarantee against punctures.

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DEALERS:—This is an especially good opportunity for you. Get our proposition at once.

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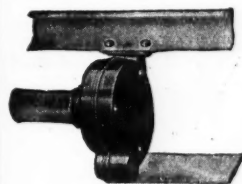
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Write for full information on the Selden Line



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It offers practically no back-pressure which, of course, means more Power at a less consumption of gas.

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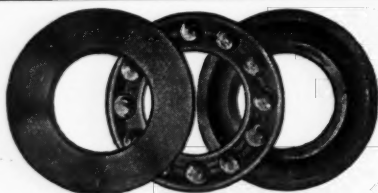
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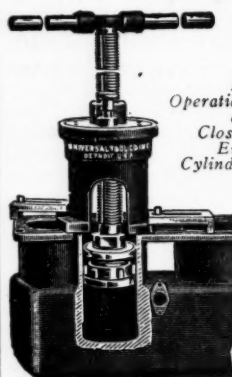
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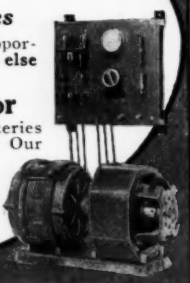
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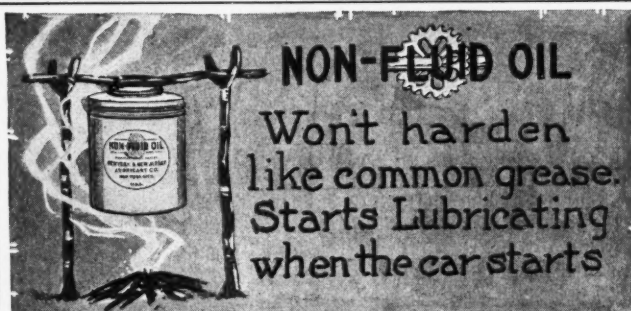
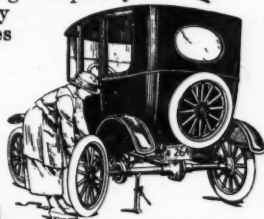
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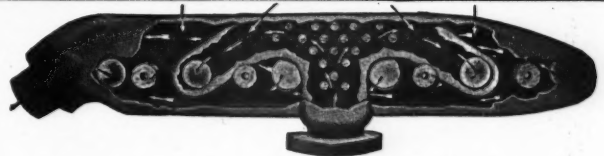
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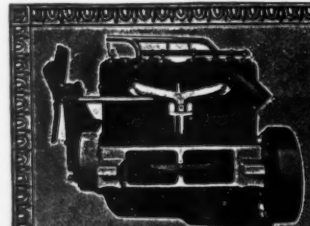
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For Trucks and Tractors

Sizes 3 1/4 x 5 1/4 to 4 1/4 x 6 1/4
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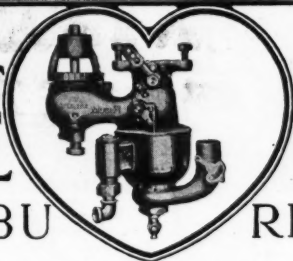
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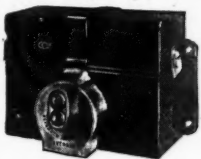
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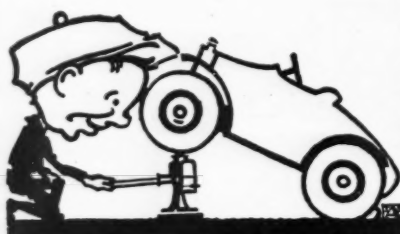


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KNOWN the world over as the *zenith* of carburetor efficiency. A long list of American builders of cars, trucks and aeroplanes believe this simple, plain tube device to be the best insurance for permanent carburetor satisfaction.

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Smooth — sure —
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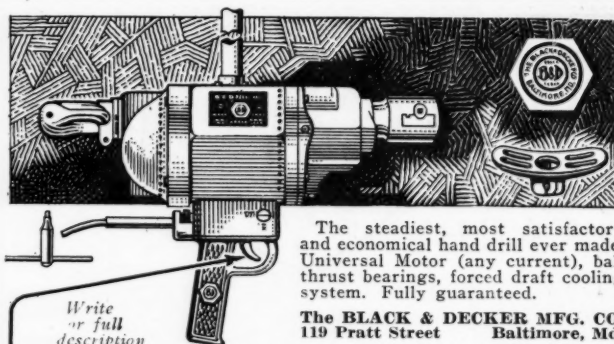
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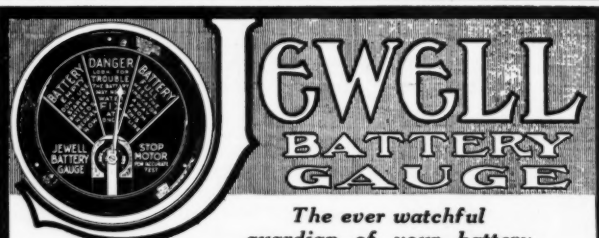
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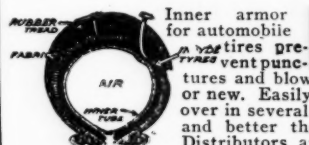
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Inner armor
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FOR PARTS, ACCESSORIES, TIRES, MACHINERY, REBUILDING, REPAIRING, WELDING AND USED CARS.
ALSO HELP AND SITUATIONS WANTED AND MISCELLANEOUS CLASSIFIED ADVERTISING

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BULLETIN
No. 9**

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| Overland 42 | 50.00 |
| Overland 59 | 60.00 |
| Vellie | 75.00 |
| Marmon | 90.00 |
| Rutberg | 125.00 |
| Michigan 40 | 100.00 |
| R. C. H. | 50.00 |
| Moon 40 | 75.00 |
| Chalmers 40 | 90.00 |
| Vellie 12 | 100.00 |
| Mitchell 15 | 100.00 |

| | |
|---------------|----------------|
| Warren 40 | Regal |
| Lincoln Truck | Dorris |
| Motor | Continental 40 |
| Palmer Meyer | Vim Truck |
| Truck Motor | Paige 25 |
| Maxwell 2 | Overland 51 |

UNIT POWER PLANTS

| | |
|------------------|----------|
| Chalmers 6, 1913 | \$125.00 |
| Vellie | 125.00 |
| Marathon | 80.00 |
| Detroit | 90.00 |
| Paige 25 | 90.00 |
| Imperial | 100.00 |

RADIATORS

| | |
|----------------|---------|
| Vellie 1912 | \$20.00 |
| Stutz, 1912 | 25.00 |
| Maxwell Spc. | 17.50 |
| Mitchell, 1913 | 22.50 |
| Flanders | 15.00 |
| Mitchell 1911 | 16.50 |
| Chalmers 40 | 20.00 |
| Imperial | 20.00 |

| | |
|----------------|-------|
| E-M-F | 15.00 |
| Krit, 1914 | 17.50 |
| Reo | 15.00 |
| Haynes, 1911 | 20.00 |
| Hudson 37 | 22.50 |
| Kline Car | 20.00 |
| Marmon, 1911 | 17.50 |
| Chalmers 30 | 17.50 |
| Regal, 1911 | 17.00 |
| Chandler, 1916 | 30.00 |
| Empire 20 | 18.00 |
| Detroit 1914 | 18.50 |
| Moon, 1911 | 17.50 |
| R. C. H., 1913 | 15.00 |
| Marathon, 1912 | 17.50 |

NEW RADIATORS

| | |
|-------------------|---------------|
| Overland 85 | \$22.50 |
| Ford | 22.00 |
| Buick 1913-4 | Paige 8 cyl. |
| Republic Truck | Briscoe 1918 |
| Federal Truck | Large Tractor |
| Stanley Steamer | Oakland 1917 |
| Oldsmobile 8 cyl. | |

Parts for Following Cars ALL MODELS

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|----------------|---------------|
| Abbott-Detroit | Mitchell |
| Allen | Moline |
| American | Moon |
| Auburn | National |
| Bergdoll | Nyberg |
| Brush | Oakland |
| Buick | Ohio |
| Cadillac | Oldsmobile |
| Case | Overland |
| Chalmers | Packard |
| Chase | Paige |
| Cole | Palmer |
| Crow-Elkhart | Palmer-Singer |
| Detroit | Parry |
| Dorris | Peerless |
| Elmore | Pierce-Arrow |
| E-M-F 30 | Pope Hartford |
| Everette | Pope-Toledo |
| F. A. L. | Premier |
| Flanders | Rambler |
| Ford | R.C.H. |
| Franklin | Regal |
| Garford | Reo |
| Glide | Seldon |
| Great Western | Speedwell |
| Haynes | Stafford |
| Herff-Brooks | Stearns |
| Hudson | Stevens |
| Hupmobile | Duryea |
| International | Stoddard |
| Interstate | Dayton |
| Jackson | Studebaker |
| King | Stutz |
| Kissell | Thomas |
| Krit | Detroit |
| Lexington | Vellie |
| Lozier | Vim |
| Marathon | Warren |
| Marmon | Wescott |
| Maxwell | Winton |
| Michigan | |

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|--|----------|
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| Buick, Model 17, 45 H. P. | 90.00 |
| Buick, Model 19, 40 H. P. | 90.00 |
| Buick, Model 21, 40 H. P. | 90.00 |
| Buick, Model 27, 35 H. P. | 75.00 |
| Buick, Model 25, 25 H. P., 1914. | 125.00 |
| Buick, Model 10, 22 H. P. | 70.00 |
| Buick 39 | 90.00 |
| Chevrolet, 1916, S. & G. | 150.00 |
| Continental, 1912, 35 H. P. | 75.00 |
| Cutting, Model T, 35 H. P. | 65.00 |
| Four E. M. F.'s, 1912, 30 H. P. | 50.00 |
| Everitt, 1912, 30 H. P. | 50.00 |
| Two Flanders, 1912, 3-speed. | 50.00 |
| Marion 37 | 100.00 |
| Metz, 1913, 30 H. P. | 45.00 |
| Mitchell 6 | 125.00 |
| Northway, 1914, 40 H. P., Jesco Starter | 75.00 |
| Overland, Model 52, 35 H. P. | 70.00 |
| Overland, Model 69, 30 H. P. | 70.00 |
| Overland, Model 79, 30 H. P., Gray & Davis Starter | 85.00 |
| Overland, Model 71, 40 H. P., U. S. L. Starter | 90.00 |
| Regal Underslung, 1913, 30 H. P. | 50.00 |
| Stoddard-Dayton, Model 30, 30 H. P. | 60.00 |
| Studebaker, 1915, S. & G. | 115.00 |
| Studebaker 25 | 40.00 |

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| Buick 31, 1913. | 110.00 |
| M40 | 125.00 |
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| Chalmers, Four-36, 1914, Air Starter. | 135.00 |
| Chalmers, Model M, 1911. | 115.00 |
| Chalmers, Model K, 1910. | 110.00 |
| Continental 6, Bosch Ignition. | 150.00 |
| Hudson, Model 33, 1912. | 125.00 |
| Hudson, 1913, En Bloc. | 100.00 |
| Northway, 1914, Starter. | 145.00 |
| Marathon, 1914, Starter. | 110.00 |
| Hupmobile 32 | 110.00 |
| Hupmobile 20 | 65.00 |
| Lexington 45 | 110.00 |
| Overland 90 | 100.00 |
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| Ford 1914 | 85.00 |
| Hudson 33 | 125.00 |
| Enger 6 | 160.00 |

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| New Departure, per set. | 2.50 to 10.00 |
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WHEELS

| | |
|-------------|--------|
| Any Size | \$2.50 |
| Demountable | 7.50 |

RADIATORS

| | |
|--------------------|---------|
| Buick 37 | \$30.00 |
| Buick 17 | 20.00 |
| Buick 25 | 17.50 |
| Buick 10 | 15.00 |
| Buick 31 | 20.00 |
| Buick 27 | 20.00 |
| Buick 19 | 20.00 |
| Buick M-40 | 22.50 |
| Cadillac, 1911 | 20.00 |
| Cadillac, 1910 | 20.00 |
| Carter-car 5 A | 20.00 |
| Cutting | 17.50 |
| Chalmers F | 17.50 |
| Chalmers K | 17.50 |
| Chalmers M | 20.00 |
| Cole 6 | 30.00 |
| E. M. F. | 20.00 |
| Flanders | 15.00 |
| Hupmobile 32 | 20.00 |
| Jackson | 17.50 |
| Midland | 20.00 |
| Overland 59 | 17.50 |
| Overland 90 | 25.00 |
| Oakland 6 | 25.00 |
| Hupmobile | 12.50 |
| Overland 69 | 17.50 |
| Overland 79 | 20.00 |
| Overland 71 | 20.00 |
| Overland 75-B | 20.00 |
| Overland 54 | 17.50 |
| Paige 25 | 17.50 |
| Paige 36 | 22.50 |
| Rambler | 15.00 |
| Stoddard-Dayton 30 | 15.00 |
| Stoddard-Dayton 50 | 20.00 |
| Hudson 33 | 20.00 |
| Krit, 1914 | 20.00 |
| Chalmers 6 | 30.00 |
| Velie 40 | 20.00 |
| Pathfinder 12 | 25.00 |
| Hudson 33 | 20.00 |

MAGNETOS

| | |
|-----------------------|------------------|
| Bosch DU-6 | \$32.50 |
| Bosch DR-6 | 30.00 |
| Bosch D-6 | 25.00 |
| Bosch DU-4 | 27.50 |
| Bosch DR-4 | 25.00 |
| Bosch D-4 | 22.50 |
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| Premier 6 cyl..... | 100.00 |
| Thomas 6 cyl..... | 125.00 |
| Rutenber 4 cyl..... | 85.00 |
| Reo 1913-14..... | 80.00 |
| Packard 30, 1911..... | 100.00 |
| Garford 11..... | 100.00 |
| Reading 40, 4 cyl..... | 100.00 |
| Everett 6 cyl..... | 90.00 |
| Pierce-Arrow 6 cyl. Mod. 36..... | 100.00 |
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| Studebaker 4 cyl..... | 65.00 |
| Renault 4 cyl..... | 100.00 |
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| Regal Block..... | 85.00 |
| Mitchell 4 cyl..... | 100.00 |
| Mitchell 6 cyl. T-head type..... | 125.00 |
| Silent Knight 4 cyl..... | 100.00 |
| Wisconsin 4 cyl..... | 100.00 |
| Cadillac 1910-11..... | 85.00 |
| Cadillac 1912-13..... | 100.00 |

UNIT POWER PLANTS

| | |
|----------------------------|----------|
| Continental Model E..... | \$125.00 |
| Cole 6 cyl..... | 150.00 |
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| | |
|-----------------------------------|--------|
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| DR4 Bosch..... | 25.00 |
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| ZR6 Bosch..... | 35.00 |
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| Simms H. T..... | 12.00 |
| Mea..... | 10.00 |
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| Remy..... | 18.00 |
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300 new Adjustable T Bumpers, nickel or black, fit all cars except Fords.....\$4.50 each
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|--------------|-------|
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| | |
|------------------------------|--------------------|
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| Remy..... | 15.00 |
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| Auto Lite, Gear Drive..... | 20.00 |
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Stewart or Warner.....\$1.50 to \$4.00

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| Overland 83..... | 75.00 |
| Overland 90..... | 75.00 |
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| Firestone-Columbia..... | 50.00 |
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|----------------------|--------|
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| Cadillac 1912..... | 75.00 |
| Cadillac 1914..... | 125.00 |
| Reo 1914..... | 85.00 |
| Buick 25..... | 90.00 |
| Chalmers 6 1915..... | 100.00 |

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| | |
|--------------------------|---------|
| Chalmers F..... | \$75.00 |
| Chalmers 17..... | 100.00 |
| Haynes 1910..... | 75.00 |
| Menominee Truck..... | 75.00 |
| King 1914..... | 100.00 |
| Auburn 1914..... | 100.00 |
| Abbott Detroit 1912..... | 100.00 |
| Paige 36 1914..... | 100.00 |
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| Cole 6..... | 150.00 |
| Vellie 6 1917..... | 200.00 |

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| Outside Lace Patches 4-5 in..... | .60 |
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| Outside Hook on Patches 4-5 in..... | .50 |
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| Spark Plugs with Priming Cup..... | .50 |
| Metal Polish..... | 10c-15c-25c |
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 Bosch DU6.....25.00
 Bosch DR4.....17.50
 Bosch DR6.....22.00
 Bosch D4.....14.00
 Bosch D6.....15.00
 Eisemann.....10.00
 Remy.....7.00
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 Coils, Generators and Starters. Silent
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 Transmissions.....Differential Gears
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| Size | Tires | Tubes | Size | Tires | Tubes | Size | Tires | Tubes |
|---------------|--------|--------|---------------|--------|--------|---------------|--------|--------|
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| 30x3 1/2..... | 5.00 | 1.45 | 33x4..... | 7.75 | 1.70 | 36x4 1/2..... | 8.75 | 1.85 |
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| 32x3 1/2..... | 5.50 | 1.50 | 35x4..... | 8.00 | 1.75 | 38x3..... | 9.50 | 2.00 |
| 34x3 1/2..... | 6.00 | 1.60 | 36x4..... | 8.00 | 1.75 | 36x3..... | 9.50 | 2.00 |
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Five passenger, one-man mohair top.....\$45.00
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 Ford Touring one-man mohair top.....37.50
 Ford Roadster one-man mohair top.....25.00
 The above prices include a complete one-man top with storm curtains and top dustproof boot, together with fittings for properly attaching front of the top to any wind shield.

We build all weather curtains and tops for every make of car.

Electric Lighting System for Fords

Generator, switches, two dash lamps, tail lamp battery, automatic generator cut-out, all wire brackets, bolts, complete ready to install.....\$10.00
 With spotlight.....11.98
 This outfit is installed without removing fan or radiator.

Accessories for Fords

Lighting and dimming switches.....\$ 1.00
 Pedal pads, per set......35
 Steering stabilizers.....3.85
 Cut-outs for Fords, complete.....1.00
 3-inch blowout patches......45
 3 1/2-inch blowout patches......50
 Electric lighting systems.....10.00
 Electric head lamps for Fords.....4.50
 Spotlight with mirror.....4.25
 Oil tail lamps.....1.75
 Champion spark plugs, each......65
 Champion spark plugs, per dozen.....6.00
 U. S. tire gauges (\$1.50 values).....1.00
 Sandow spark plugs, each......35
 Sandow spark plugs, per dozen.....3.50
 Leak proof piston rings, each.....1.00
 Leak proof piston rings, per dozen.....10.00
 Stewart speedometers.....7.50
 Double action tire pumps.....2.00
 Automobile jacks.....1.90
 Bucket seats, racing type (per pair).....16.50
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 Long slope speedsters fenders (set four).....10.00

Puritan Machine Co.

49 Puritan Building
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WICHITA AUTO WRECKING CO.

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EXCEPTIONAL VALUES IN MOTORS

We have parts for the following cars:
 American Understung
 Auburn 30-40
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 J. I. Case 40
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 Chalmers F-K-L & Six 10-11M-18—Clark 40
 Cadillac 1909-1910
 Cameron—Crawford
 Detroit—Enger 40
 E. M. F. 30—Fal Car
 Flanders 2 & 3 speed
 Firestone Columbia
 Fuller
 Ford—N. R. & S.
 Great Northern
 Halladay—Haynes 1910
 Herreshoff—Hupp 20
 Hudson 20
 L. C. H. 2 & 4 cylinder
 Jackson 2 & 4 cylinder
 Olympic-Majestic 45-50E
 Kissel Kar 40
 King—Knox 40
 Lambert 2 & 4 cylinder
 Lexington 40
 McFarland Six
 Marathon 30-40
 Marmon 30—Rear axle & transmission
 Maxwell 2 & 4 cylinder;
 K-Q-25—Mitchell 40
 Moon 40
 Mason "May Tag" 4 cyl.
 Monarch 40—Moline
 Monroe
 Overland 30-32-35-38-41-42-52-56-59-69-71-75BR-79-81-83
 Oldsmobile 40
 Oakland 2 & 4 cyl. 30-40
 Packard 1910—Premier
 Paige Detroit 25 H. P.
 Pullman 40
 Reo 2 & 4 cyl. 4th & 5th
 Rider Lewis—Sellers
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Complete Motors, Transmissions and Rear Axles. Money refunded on all parts within 10 days if unsatisfactory.

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Full Stock of Parts for

MICHIGAN DRAGON LOZIER
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We maintain a complete stock of parts for the above cars.

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For Practically All Makes of Cars
 60 per cent to 85 per cent off list price.
 Send in your old parts for duplication. Write us
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| 6 cyl. Lycoming Motors..... | Each \$ 90.00 |
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Get our bargain sheet.

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Are assured prompt, complete, and satisfactory service direct from our factory at Cleveland, where we have the necessary drawings, patterns, tools, fixtures and a large supply of parts.

All repair orders and correspondence should be addressed to

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WIRE WHEELS

New, Rebuilt, Repaired
SINGLE WHEELS OR SETS
All Makes, All Sizes
PARTS AND TOOLS
Quick Delivery, Best Prices

We are prepared to meet any emergency arising out of the use of wire wheels.

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Parts and Repairs.

Parts and Repairs. Rebuilding and Repairing.

Rebuilding and Repairing.

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A Complete Line of All Parts AT A GREATER SAVING!
ATTENTION! — We Undersell Them All! —
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AUTO SAVE 50-90% PARTS FOR 400 CARS

POPE, PACKARDS, PIERCE,
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|-----------------------|------------|------------------|---------|
| Motors | \$25.00 up | Presto Tanks, \$ | 4.50 up |
| Magnetos | 4.00 " | New Spotlights | 2.00 " |
| Carburetors .. | 3.00 " | Generators .. | 10.00 " |
| Rear Axles.... | 15.00 " | Gears | 1.00 " |
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STODDARD DAYTON PARTS PAIGE-DETROIT

Rear Axle Bevel Gears and Pinions
These Are All New Parts

THE DAYTON AUTO PARTS CO.
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SPEED SPECIALTIES—FORD

Underlugs parts for Fords, complete
with instructions, per set.....\$20.00
 Counterbalances for the Ford crankshaft,
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 Speedway racing bodies 29.50
 3 to 1 gears, 2½ to 1, set..... 15.00

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OWNERS—Assure yourself of prompt, accurate and dependable service by ordering Michigan repairs direct. We have sole possession of all patterns, engineering records, etc. Address all correspondence and orders to

MICHIGAN MOTOR CAR PARTS CO.
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For Transmissions and Differentials.
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Brush; Buick, 2 cyl., 10-16-17-19-25-25C-27-30-31-35-40; Cadillac, 10; Chalmers, 30-36; Cutting, 12; E. M. F., all models; Empire, 31; Flanders, 20; Hudson, 20-33; Hup, 20; Imperial, 34; International Truck 15, Model E; Kissel Kar, 10; Maxwell, 2 cyl., Mascott Special and 1 and E.; Metz, 22; Mitchell, 10-1114, 4 cyl. and Big Six; Moline 9, Dreadnaught M-35; Overland, 38-39-42-52-59-79; Oakland, 35-40-42; Rambler, 10; Regal, all models to 13 and Underslung 20.
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Gears, bearings, axles, parts, tires, joints, Bosch magnets, starters, carburetors, etc. Big stock, low prices. Service.

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OWNERS, get your service direct from the factory. We alone can furnish immediate and accurate shipment of ALL repair parts. Address all correspondence to

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Parts for All Models

SAVE YOUR MONEY—Buy your Transmission and Differential Parts from us, 30% discount allowed from list on all rear axle parts.

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The only way you can be assured of accurate and dependable repairs is to deal direct with this company which has advantage of all patterns, tools, engineering records, etc.

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GUARANTEED PARTS

Half List Price—Genuine Packard, Cadillac, Buick, and other parts, all good as new. Goods shipped inside of 24 hours.

Your money's worth or your money back.

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Krit Owners We furnish quick service on all engines, clutch, transmission, differential, front and rear axle, steering gear, wheels, steering knuckles and cones, fenders, frames and body parts—from original Krit stock. For all models from 1900-15, inc.

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Rims—All New and Old Types

and parts for all makes of rims. Get my prices on spare rims, locking rims, side rings, for any make of car. Quick service. Free rim information.

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RIMS All Makes and Kinds

Parts, Side and Lock Rings, Bolts and Wedges. Dealers, write for prices

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A. C. Motors—¼ H. P., \$15.00; ½ H. P., \$35.00. **Battery Charging Sets**—100 Robbins & Myers, new machines, \$30.00 each and up. Charging and Lighting Generators, \$10.00 and up. A. C. Motors, 1 and 3 phase, up to 5 H. P., for immediate delivery. Bankruptcy stock. Less than ½ price. Write for bulletin 89.

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NOT FILED AND REGROUND—BUT
REGROUND ON SPECIAL GRINDERS
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NEW OVERSIZE PISTON RINGS AND PINS FOR TRUCKS, TRACTORS AND PASSENGER CARS.

Highest grade machinery equipment, no makeshift tools. Highest grade work fully guaranteed. Patterns for all pistons, 20,000 piston rings in stock.

Aluminite Pistons and Connecting Rods

put six cylinder smoothness into four cylinder motors, give any motor more power, more speed, quicker get away and more miles per gallon. **FOR TRUCKS AND TRACTORS**, increase the power of the motor and save the bearings and cylinders.

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Keep the motor cool, especially efficient on Fords converted into trucks and tractors.

GUARANTEED MOTORS, complete stock new and rebuilt for cars, trucks and tractors. Parts for all motors and cars. Motors rebuilt. Our machinery equipment and factory space recently doubled insuring prompt delivery and perfect work.

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ASK OUR CUSTOMERS

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Over 800 Piston Patterns Always in Stock.

Our Expert Mechanics and our Highest Grade Equipment are your guarantee for highest class workmanship.

Our Special Light Alloy Pistons will give you More Power—More Speed; we also do Gear Cutting of Spur and Bevel Gears.

Write to Us Today

Auto Engine Works
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WE GRIND

Cylinders and fit special heat-treated Pistons. Welding of all kinds of Metals. Gear Cutting of all kinds.

PONDELICK BROS.

Largest Mfrs. of Duplicate Auto Parts in U. S.
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CYLINDER REGRINDING PISTONS RINGS PINS

Largest in Middle West

Our complete records give Per-
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including new pistons and rings. Any size—
\$7 to \$8 per cylinder. All our work guaranteed.
Quick shipments. Let us prove our ability on
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REGROUND. Piston Rings and
Wrist Pins made to fit. All work Guar-
anteed. Most Accurate Machinery. Skilled Mechanics.
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CYLINDER

Reground—We Weld Anything
Fitted with cast iron or light pistons;
leak-proof or plain piston rings.
Best equipped shop in the country.
Quick Service—Reasonable Prices—Gear Cutting
SIoux CITY WELDING & MACHINERY CO.
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Scored Cylinders Repaired

We use the same pistons. General machine work for
foreign and American cars. All parts duplicated. Weld-
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Quick service, satisfaction guaranteed.**ANDRE CAIELAIN**

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HIGH GRADE TIRES & TUBES

BEST VALUES ON THE MARKET
A Trial Order Will Convince You

Send for Prices

No Mileage Guarantee at Our Low
Prices. Special Proposition to Dealers**Armstrong Tire & Vulcanizing Co.**

1336 Michigan Ave. Chicago, Ill.

Branch: 1612 Michigan Avenue

Phones: Calumet 5212, Calumet 2199

Special Bargains in SLIGHTLY USED TIRES

The kind that will satisfy all customers.

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|-----------------|-----------------|
| 30x3.....\$4.00 | 34x4.....\$8.00 |
| 30x3½.....5.00 | 34x4½.....8.25 |
| 32x3½.....6.00 | 35x4½.....8.50 |
| 31x4.....6.50 | 36x4½.....8.75 |
| 32x4.....7.00 | 37x4½.....9.50 |
| 33x4.....7.75 | 37x5.....10.00 |

Send \$1.00 deposit with each tire ordered. Balance C. O. D. subject to examination. Specify if Clincher, Q. D., or Straight Side.

No Mileage Guarantee at the Above Prices

American Tire & Vulcanizing Co.

Phone: Calumet 5170

2136 S. MICHIGAN AVE. CHICAGO, ILL.

Tires.

Tires.

TIRES & TUBES

SLIGHTLY USED AND FACTORY REPAIRED
TIRES AND TUBES—QUALITY ABOVE ALLThe QUALITY of our tires and tubes is superlative, the PRICE
cannot be equaled and our SERVICE cannot be excelled.

A satisfied customer is our biggest asset, therefore we must satisfy you.

| Size | Tires | Tubes | Size | Tires | Tubes | Size | Tires | Tubes |
|------------|---------|--------|------------|---------|--------|------------|---------|--------|
| 30x3..... | \$ 4.00 | \$1.35 | 32x4..... | \$ 7.00 | \$1.60 | 35x4½..... | \$ 8.50 | \$1.80 |
| 30x3½..... | 5.00 | 1.45 | 33x4..... | 7.75 | 1.70 | 36x4½..... | 8.75 | 1.85 |
| 31x3½..... | 5.25 | 1.50 | 34x4..... | 7.75 | 1.70 | 37x4½..... | 9.25 | 1.90 |
| 32x3½..... | 5.50 | 1.50 | 35x4..... | 8.00 | 1.75 | 35x5..... | 9.50 | 2.00 |
| 34x3½..... | 6.00 | 1.60 | 36x4..... | 8.00 | 1.75 | 36x5..... | 9.50 | 2.00 |
| 31x4..... | 6.25 | 1.65 | 34x4½..... | 8.25 | 1.75 | 37x5..... | 10.00 | 2.20 |

Send \$1.00 deposit with each tire ordered. Tires will be sent promptly C. O. D.,
with privilege of examination. Specify style of rim to avoid delay.Our slightly used tires bear no mileage guarantee; but in the event that they
do not give service in proportion to the price, you may return them to us by
prepaid express and we will cheerfully make a fair adjustment.

We carry a complete stock of New Tires—Write for Prices

LINCOLN TIRE & SUPPLY CO.

1463 S. Michigan Ave.

Chicago, Illinois

QUALITY REMAINS WHEN PRICE IS AT SERLIN'S FORGOTTEN

Business is sensitive. It goes where it is invited and stays where it is well
treated. We invite yours.

NEW AND USED AUTO TIRES STANDARD MAKE FRESH STOCK

| Size | New Tires | Used Tires | New Tubes | Size | New Tires | Used Tires | New Tubes |
|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| 30x3..... | \$ 8.35 | \$ 4.50 | \$1.80 | 33x4..... | \$17.70 | \$ 8.00 | \$3.00 |
| 32x3..... | 9.50 | 5.00 | 1.95 | 34x4..... | 18.10 | 9.00 | 3.00 |
| 30x3½..... | 10.80 | 5.50 | 2.00 | 35x4..... | 18.75 | 9.00 | 3.10 |
| 31x3½..... | 11.40 | 6.00 | 2.25 | 36x4..... | 21.20 | 9.50 | 3.10 |
| 32x3½..... | 12.65 | 7.00 | 2.25 | 34x4½..... | 24.40 | 9.50 | 3.30 |
| 33x3½..... | 13.40 | 7.50 | 2.35 | 35x4½..... | 25.50 | 10.00 | 3.35 |
| 34x3½..... | 13.45 | 7.50 | 2.50 | 36x4½..... | 25.90 | 10.00 | 3.40 |
| 36x3½..... | 15.00 | 7.50 | 2.65 | 35x5..... | 29.10 | 12.00 | 4.00 |
| 30x4..... | 16.00 | 7.00 | 2.70 | 36x5..... | 30.00 | 12.00 | 4.10 |
| 31x4..... | 16.65 | 7.00 | 2.75 | 37x5..... | 30.75 | 12.00 | 4.20 |
| 32x4..... | 16.95 | 8.00 | 2.80 | 38x5½..... | 33.00 | 15.00 | 4.50 |

ADD FIVE PER CENT FOR NON-SKID

Mail orders filled same day received. Deposit sufficient to defray express charges will bring
shipment, balance C. O. D., subject to examination. No definite mileage guarantee, but
reasonable adjustments cheerfully made.

FIVE PER CENT DISCOUNT ALLOWED FOR CASH WITH ORDER

SERLIN TIRE CO., INC.,1300-1302 Michigan Ave.
CHICAGO, ILL.

HIGH GRADE QUALITY TIRES & TUBES Manufacturers' Surplus Stock of Factory Seconds

| Size | Plain | Non-Skid Tubes | Size | Plain | Non-Skid Tubes | | |
|------------|---------|----------------|--------|------------|----------------|---------|--------|
| 28x3..... | \$ 9.15 | \$ 9.55 | \$1.80 | 34x4..... | \$19.30 | \$20.25 | \$3.40 |
| 30x3..... | 8.70 | 9.40 | 1.95 | 36x4..... | 20.75 | 21.50 | 3.65 |
| 30x3½..... | 11.35 | 11.95 | 2.30 | 34x4½..... | 24.85 | 27.45 | 4.15 |
| 32x3½..... | 12.75 | 14.45 | 2.40 | 35x4½..... | 25.90 | 27.60 | 4.30 |
| 31x4..... | 17.65 | 18.50 | 3.00 | 36x4½..... | 26.70 | 29.20 | 4.40 |
| 32x4..... | 18.10 | 19.00 | 3.05 | 37x5..... | 33.75 | 34.45 | 5.30 |
| 33x4..... | 18.75 | 19.60 | 3.25 | 35x5..... | 32.75 | 34.40 | |

We warrant each and every casing to give satisfactory service, but do not give any
definite mileage guarantee

5% FOR CASH IN FULL WITH ORDER

Save this discount, as upon arrival of shipment you still have the privilege of returning
any items which do not come up to expectations for full cash refund.**STERLING TIRE & SUPPLY HOUSE**

1355 Michigan Avenue

CHICAGO, ILL.

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Tires.
Magnetos and Service Stations.

Tires.
Magnetos and Service Stations.

TIRES SPECIAL SPECIAL SPECIAL TUBES

ECONOMY TO MOTORISTS

Select Your Supply Now for The Season—Slightly Used and Factory Repaired
TIRES and TUBES—A Trial Will Convince You

Largest and most complete stock of slightly used tires in all makes for immediate shipment.—NO JUNK.

| Size | Tires | Tubes | Size | Tires | Tubes |
|----------|---------|--------|----------|-------|-------|
| 30x3 | \$ 4.00 | \$1.35 | 35x4 | 8.00 | 1.75 |
| 30x3 1/2 | 5.00 | 1.45 | 36x4 | 8.00 | 1.75 |
| 31x3 1/2 | 5.25 | 1.50 | 34x4 1/2 | 8.25 | 1.75 |
| 32x3 1/2 | 5.50 | 1.50 | 35x4 1/2 | 8.50 | 1.80 |
| 34x3 1/2 | 6.00 | 1.60 | 36x4 1/2 | 8.75 | 1.85 |
| 31x4 | 6.25 | 1.65 | 37x4 1/2 | 9.25 | 1.90 |
| 32x4 | 7.00 | 1.60 | 35x5 | 9.50 | 2.00 |
| 33x4 | 7.75 | 1.70 | 36x5 | 9.50 | 2.00 |
| 34x4 | 7.75 | 1.70 | 37x5 | 10.00 | 2.20 |

Freight Prepaid on all orders exceeding \$50.00 when check in full accompanies order, otherwise \$1.00 deposit with each tire ordered. Specify style of rim to avoid delay.

Although at the above prices these tires bear no mileage guarantee, we will make reasonable adjustments should they prove unsatisfactory. All tires sent in for adjustment must be prepaid.

We also carry a complete stock of new tires. Write for prices

AETNA TIRE & SUPPLY COMPANY
1429 Michigan Avenue Chicago, Illinois

Magnetos and Service Stations.
Radiator and Lamp Repairing.

If It's Electrical WE CAN FIX IT

Any Starting, Lighting, Ignition System.
WE OFFICIALLY REPRESENT

WESTINGHOUSE CONNECTICUT
K.W. IGNITION DYNETO
BERLING MAGNETO BENDIX DRIVES
PHILBRIN JESCO (Jones Starter)
BRANFORD CARBURETOR

VAN SICKLEN SPEEDOMETERS
WALTHAM SPEEDOMETERS
HEINZE SPRINGFIELD FORD STARTERS
LET THE MAN WHO KNOWS
HANDLE YOUR REPAIR WORK

Arthur Jones Electric Co.
ESTABLISHED 1903
2837 S. STATE ST. CHICAGO, ILL.

ELECTRIC REPAIR SERVICE

We represent eight factories.
ELECTRICAL TESTING CO.
PEORIA, ILL.

NEW AND USED TIRES

Best Values Ever Offered for the Money

| NEW TIRES | | | USED TIRES | | | |
|------------|--------|-------|------------|--------|-------|---------|
| Size | | Size | Size | | Size | |
| 30x3 | \$9.00 | 34x4 | 30x3 | \$4.00 | 36x4 | \$ 8.50 |
| 30x3 N. S. | 9.50 | 34x4½ | 30x3½ | 5.00 | 34x4½ | 8.75 |
| 30x3½ | 12.40 | 35x4½ | 32x3½ | 6.50 | 35x4½ | 9.50 |
| 32x3½ | 14.55 | 36x4½ | 31x4 | 6.50 | 36x4½ | 9.50 |
| 31x4 | 19.00 | 35x5 | 32x4 | 7.00 | 37x4½ | 10.00 |
| 32x4 | 19.40 | 37x5 | 33x4 | 7.50 | 35x5 | 10.00 |
| 33x4 | 20.25 | | 34x4 | 8.50 | 37x5 | 11.00 |

All goods shipped promptly. \$1.00 deposit required with each tire ordered; balance C. O. D., subject to examination, at the above prices without a guarantee; specify whether new or used, clincher or straight side. Special proposition to dealers.

ROYAL TIRE & SUPPLY COMPANY
1461 Michigan Ave., Chicago, Ill. Phone—Calumet 2553

PROMPT SHIPMENTS MADE AUTO TIRES AND TUBES EXPRESS PREPAID ON ALL ORDERS

At the following prices we give no mileage guarantee, but will make reasonable adjustment should tire prove unsatisfactory. All tires sent in for adjustment must be prepaid:

| Size | Non-Skid. Tubes. | Size | Non-Skid. Tubes. | Size | Non-Skid. Tubes. |
|----------|------------------|------|------------------|----------|------------------|
| 28x3 | \$ 8.00 | 31x4 | \$16.45 | 34x4 1/2 | \$22.95 |
| 30x3 | 8.45 | 32x4 | 16.95 | 35x4 1/2 | 23.60 |
| 30x3 1/2 | 11.30 | 33x4 | 17.25 | 36x4 1/2 | 23.95 |
| 31x3 1/2 | 11.95 | 34x4 | 17.95 | 37x4 1/2 | 24.95 |
| 32x3 1/2 | 12.95 | 35x4 | 18.45 | 35x5 | 26.25 |
| 34x3 1/2 | 14.45 | 36x4 | 18.95 | 36x5 | 27.00 |
| 30x4 | 16.00 | | | 37x5 | 27.95 |

"Special Proposition to Live Dealers"

Express prepaid on all orders. A 2% discount may be deducted, if check in full accompanies order. Otherwise a 10% deposit required. Balance C. O. D.

LEADER TIRE & RUBBER COMPANY
709 North Broad Street Philadelphia, Pa.

HIGH GRADE TIRES AND TUBES

Factory Seconds, Unguaranteed, at Interesting Prices. Also complete line of Firsts.
Write Us Your Needs
ACORN TIRE & REPAIR CO.
1350-54 South Michigan Ave. CHICAGO, ILL.

Send It to Detroit

Official Service and Parts Representatives for Atwater-Kent, Auto-Lite, Berling, Bijur, Connecticut, Delco, Dyneto, Heinze-Springfield, K.W. Ignition, Klaxon, Remy, Simms-Magnetos, Westinghouse, etc.

COMPLETE STOCK OF
GENUINE PARTS
All work and parts guaranteed
AUTO ELECTRIC & SERVICE CORP.

11 TO 19 SELDEN AVENUE
PHONE: GLENDALE 3353

Expert Repair Service

ON EVERY KNOWN
MAGNETO IGNITION SYSTEM
STARTING MOTOR
GENERATOR ARMATURE WINDING
All Repairs Promptly Executed
All orders for repair parts shipped the day orders are received
AMERICA'S MOST COMPLETE
IGNITION, LIGHTING AND STARTING
INSTITUTION

PELLET MAGNETO CO.
Twenty-fifth and Wabash Avenue.
CHICAGO

Pioneer

RADIATOR Manufacturers

Rebuilding, Repairing, and Manufacturing of Radiators for any make of car. Why send your Radiator down East when you can ship to us; save time, expense, freight, money, and be assured of expert workmanship? Our prices are right. We make new Radiators and allow for old ones.

TODD MANUFACTURING CO. Minneapolis, Minn.

When Writing to Advertisers, Please Mention Motor Age

BOSCH MAGNETOS

We buy and sell all models. We are in position to supply quantities of any model at prices that will surprise you. Repairmen, write us your requirements. Parts and platinum points for all makes. All goods guaranteed to give perfect satisfaction or money refunded.

WIGHT & MANUS
418 S. Sacramento Blvd. Chicago, Ill.

RADIATORS

We repair Radiators of all kinds—Any Make or Any Style
MITCHELL RADIATOR REPAIR COMPANY
933 Ft. Wayne Ave.
Indianapolis Indiana

Buy and Sell Used Radiators

A NEW Radiator or Your Old One Repaired
Repairs in one day—a new radiator in two days.
Mfrs. of Ford Racing bodies, fenders, hoods, gas tanks, and all auto sheet metal works.

WABASH AUTO RADIATOR MFG CO.
1117-19-21-23 S. Wabash Ave., Chicago

RADIATORS

OUR HONEYCOMB RADIATOR embodies STRENGTH COOLING POWER NEATNESS
Repairing and recoring old radiators. Everything in the automobile sheet metal line

We solicit your inquiries
ILLINOIS AUTO SHEET METAL WORKS
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Motor Age, Mallers Building, Chicago

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All Classified forms now close Friday noon. Be sure all orders and copy are mailed to reach us not later than Friday morning.

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Help Wanted.
Situations Wanted.

Help Wanted.
Situations Wanted.

Tool Room Foreman

We want a broad gauge tool room foreman, who has had several years experience, who knows how to lead men to their best work and speed, who can get results. We can not consider applicants now engaged on war contracts. Address

Box—E-888, care MOTOR AGE

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30c per line; minimum price, \$1.20

Payment in advance required. Compute six words to the line. Forms close Friday noon each week.

Wanted—Good Auto Accessory to Sell
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I am already representing one of the liveliest accessory lines and can give A1 service to another good one. 15 years success in this territory. Draft exempt and 100% fit. Address 575 Old Colony Bldg.

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Any man looking for a good connection in the motor car field should seriously consider giving this paper the opportunity to locate the desired job, especially at rates quoted, which are about one-half the classified rates. We will write your advertisement free of charge on receipt of full information as to your experience, qualifications, age and any other information which will help us to make up for you an attractive advertisement.

Situation Expert, Classified Adv. Dept.
MOTOR AGE

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Have built up a lucrative business by telling of their facilities and service in these sections.

WHY NOT YOU?

Write us what you have to sell and to whom you want to sell, as we are always glad to tell of our ability to serve you and our facilities for co-operating with you.

CLASSIFIED DEPARTMENTS

MOTOR AGE

Mallers Building

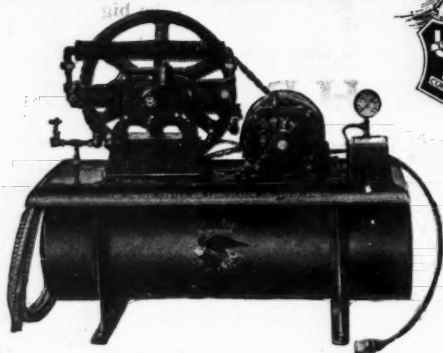
CHICAGO

The Advertising of Accredited Firms and responsible individuals is solicited for this Section, as we are desirous of furnishing our thousands of readers with the best ACCESSORIES, SUPPLIES and SERVICE.

Let us give you complete information

Clearing House Adv. Dept.

Mallers Bldg. Motor Age Chicago



If It's An Air Compressor You'll Find it in the U. S. Line

THE United States line is complete, containing air compressors for every service up to 500 pounds pressure. Compressors are furnished in both Two Stage and Single Stage types and every unit is absolutely guaranteed.

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REFINED strength—rugged dependability—smooth, pliant power for full loads on heavy roads. These are the essentials of a great motor truck. They are built into the

ONEIDA TRUCK

to a degree that has clearly marked it as one of America's great trucks. Dealers are wiring and writing to see if their territory is still open.

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1, 1½, 2, 3½ and 5-Ton Models
All Worm Drive

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DEPT 429
GREEN BAY

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Western Factory Branch, 1626
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California Distributors, Rannels
Motor Sales Co., 141-7 Grove St.,
San Francisco, Eastern Virginia
Distributors, Onida-Norfolk Truck
Co., 786 Granby St., Norfolk, Va.



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H B Lighting and Battery Charging Outfit

Hundreds of garages where electric current is not available are using this money-making equipment. Operates from line shaft or engine, giving ample capacity for brilliant lights at low cost and recharging from one to six 6-volt auto storage batteries at one time. Income 75c to \$1.50 per battery, with average cost of only 12c to 15c.

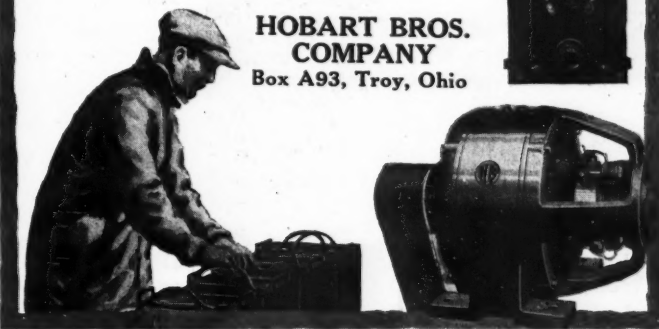
\$18.50 Puts This Money-Making Outfit in Your Garage

Balance in 10 monthly payments of \$12.00 each. Write for full information, or send cash payment with trial order. Under absolute money-back guarantee, you run no risk.

We furnish also electrically operated equipment

Write for information

**HOBART BROS.
COMPANY**
Box A93, Troy, Ohio



K & S

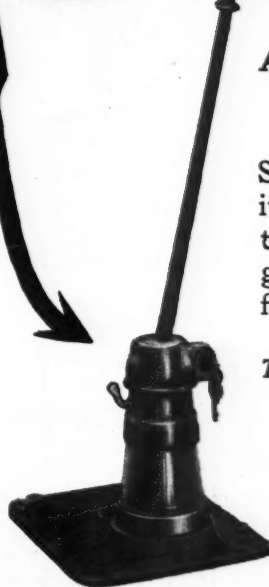
Auto Shifting Lever Lock

Simplicity, quality and sure action are mighty good features to find in a lock.

The K. & S. LOCK has been approved by experts

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WANTED**

K. & S. AUTO HEATER AND LOCK CO., Inc.
3357 South Michigan Avenue, CHICAGO, U. S. A.



Presto Products



Electric Heater

At night simply screw the plug into the nearest electric light socket, put the Presto Heater under the hood and be assured of a warm and easy starting engine in the morning.

Here are three big features

Easy Starting—Keeps the engine, manifold, carburetor and radiator warm during the night, thereby making starting as easy as in warm weather.

Safety—There is absolutely no danger of fire, as where flame heat is used.

Economy—Delivers the heat exactly where it is wanted—inside the hood. It is far cheaper to heat the engine than to heat the entire garage.



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Body Brace for Ford Cars

The Presto Brace is a powerfully built Ford body brace that is constructed scientifically like a trussed steel structure. Stops vibration—avoids sagging of running boards and prevents their breaking away from fenders—prevents broken springs—prevents uneven strain—holds drive shaft in position—holds all mechanical parts in alignment—equalizes spring action—easily installed, no holes to drill, no mechanic necessary.

Price only \$3.50 in U. S. A.
except west of Rockies, \$4.00.
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Metal Specialties Mfg. Co.

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A Permanent Profit Possibility

THE dealer who handles wire wheels is establishing a permanent and profitable agency. Wire wheels are a necessary accessory. The best known and most widely used are Houk Wire Wheels for all makes of cars and House Wire Wheels for Fords. They are made by the world's largest wire wheel manufacturers. You should get the particulars of the Wire Wheel Service and Sales Agency proposition without delay.

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(Successors to Houk Manufacturing Co.)

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New York

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San Francisco, 1690 Pine Street

Exclusive Canadian Representatives:

DUNLOP TIRE & RUBBER
GOODS CO., Toronto

House Wire Wheels for Fords

List price for set of 5 wire wheels, 4 inner hubs, 4 hub caps, hub cap wrench, spoke nipple wrench, one hub dust cover for spare wheel, \$65. White, black, red. Colors optional.

\$65



For Any Make or Model of Car

HOUK quick change wire wheels are furnished for any make of car. Our free book explaining the safety, comfort and economy that make wire wheels real life insurance, car insurance and tire insurance, will be sent free upon request.

Houk Wire Wheels

| Name of Car | Model | Year | Name of Car | Model | Year |
|----------------------|------------|------|--------------|---------------------|-----------|
| Abbott | 6-44, 6-60 | 1917 | King | EE | 1917 |
| Anderson | 6-60 | 1917 | Kissel | 100 point | 6 1917 |
| Anderson Elec. | 1917-8 | | Kissel | 12 | 1917 |
| Ap're'n R'dapl. | 6-60 | 1917 | Kline | 6-38 | 1917 |
| Apperson | 6 & 8 | 1917 | Lexington | 8-O | 1917 |
| Atburn | 1917 | | Liberty | 10-A | 1917 |
| Baker B&L | G-A | 1917 | Locomobile | R7&M7 | 1917 |
| Barley | Rosner | 1917 | Lozier | 82 1914 84 | 1917 |
| Biddle | D | 1917 | Madison | 6-40 | 1917 |
| Bour Davis | 17 | 1917 | McFarlan | 127 | 1917 |
| Briscoe | 4-48, G-24 | 1917 | Mar. Handley | 6-60 | 1917 |
| Buick Various Models | | | Marmen | 34 | 1917 |
| Cadillac | 55 | 1917 | Maxwell | 28 | 1917 |
| Cass | 40 | 1917 | Merced | 22-73 | 1917 |
| Chalmers | 25C | 1917 | Milburn | C-48, D-40 | 1917 |
| Chalmers | 6-40or82B | 1917 | Mitchell | Knight | 1917 |
| Chandler | D | 1917 | Moline | 6-43, 6-66 | 1917 |
| Chevrolet | 8 cyl. | 1917 | Moon | 70-T | 1917 |
| Cole | 8 cyl. | 1917 | Murray | 6 & 12 cyl. | 1917 |
| Columbia | D | 1917 | National | 60, 34 | 1917 |
| Crow Elkhart C-E | 28 | 1917 | Oakland | 45, 37 | 1917 |
| Cunningham | V | 1917 | Olds | Overland All Models | 1917 |
| Daniels | A | 1917 | Owen | Magnetic | 0-36 1917 |
| Darling | 1917 | | Packard | 225 & 236 | 1917 |
| Davis | Light 6 | 1917 | Paige | H-6 & K-6 | 1917 |
| Disbrow | Special | 1917 | Paige | G-6 & J-6 | 1917 |
| Dixie Flyer | 1917 | | Pathfinder | 3-B | 1917 |
| Dodge | 1917 | | Patterson | 6-45 | 1917 |
| Dorris | 6 cyl. | 1917 | Pearson | 1917 | |
| Dort | 8 & 6 | 1917 | Pierce | 6-48, 6-68 | 1917 |
| Economy | 4 cyl. | 1917 | Pilot | 6-45 | 1917 |
| Economy | 8 cyl. | 1917 | Premler | 6-35 | 1917 |
| Elcar | D. E. F. | 1917 | Fullman | 4-34 | 1917 |
| Egin | 1917 | | Regal | J. F. | 1917 |
| Empire | 60 | 1917 | Rex | R | 1917 |
| Empire | 70-70 A | 1917 | Rosner | 1917 | |
| Enger | Twin Unit | 1917 | Ross | C | 1917 |
| Erie | 33 & 34 | 1917 | Saxon | 8-4 | 1917 |
| F. I. A. T. | 55 | 1917 | Scripps | 4 cyl., 8 cyl. | 1917 |
| Franklin | Series 9 | 1917 | Singer | 1917 | |
| Grant | K | 1917 | Standard | E & E | 1917 |
| H. A. L. | 21 | 1917 | Stanley | Steamer | 1917 |
| Harrow | 1917 | | Stearns | 32-33-Sk-5 | 1917 |
| Haynes | 6 cyl. 36 | 1917 | Studebaker | SP&ED | 1917 |
| Haynes | 12 cyl. 40 | 1917 | Stutz | R | 1917 |
| Haller | 186 | 1917 | Velle | 38 | 1917 |
| Hudson | Super Six | 1917 | Vim | 1917 | |
| Hupp | N | 1917 | Westcott | S-17, U-50 | 1917 |
| Interstate | 1917 | | White | 16 valve 4 cyl. | 1917 |
| Jackson | 349 | 1917 | Winton | 22-A | 1917 |
| Jeffery | 473 & 671 | 1917 | | | |
| Jordan | 60 | 1917 | | | |

Additional Models

In addition to this list we can supply sets of wire wheels for the majority of these makes of cars, and others of older models.

In ordering wheels or parts always specify make, model and year of car. Also size and type of tire, whether straight side or clincher, with diameter of hub cap at threads. This information should accompany every order for any part.

HOUSE

for Fords

HOUK

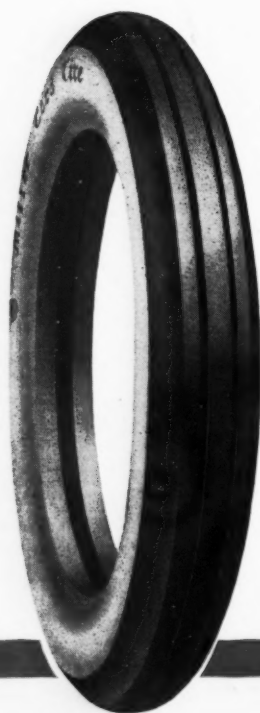
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Uniform Mileage and Satisfied Customers

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Motorists have found in the Miller Uniform Tire the uniform mileage they have long been wanting. Miller tires wear alike because they are built alike.



Every tire must measure up to the highest standard that high skilled labor and high quality material can produce.

More motorists are hearing of Miller Uniform tires every day because we are constantly

advertising. And more motorists are learning daily that Miller Tires—uniform in mileage under like conditions and “geared-to-the-road”—are the most satisfactory tires.

A phenomenal demand is made for Miller Uniform Tires, both cord and fabric. The dealer holding the Miller agency is benefiting by that demand. Miller products bring new business and hold it, because the customer is satisfied.

The Miller Plan for dealers will interest you. Write at once for it.

The Miller Rubber Company, Dept. A. 44, Akron, O.

Makers of Miller Red and Gray Inner Tubes—The Team-Mates of Uniform Tires